Transport Canada Transports Canada

A new **bridge** for the St. Lawrence

Environmental Assessment

Part II, Sections 5 to 13

Assessment of Effects and Mitigation Measures

Draft Version

April 2013

Canada

Transport Canada

New Bridge for the St. Lawrence Environmental Assessment

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EXECUTIVE SUMMARY

This report covers the second phase in the environmental assessment process, i.e. the description of the effects that the project will have on the environment and proposed mitigation measures. Part one dealt with a description of the project and the environment.

To identify the potential effects of the project, the relationships between the various project phases and the environmental components were established. For each effect, the significance of the effect was assessed according to three parameters, intensity, duration and scope. Mitigation measures were identified to reduce the significance of the effects and ensure that the residual effects are not significant within the meaning of the *Canadian Environmental Assessment Act,* S.C. 1992, c. 37 (CEAA).

Because the project design is at the preliminary phase, a number of environmental effects will be considered during the upcoming design phases in order to reduce the impacts during the work. Additional studies are also planned during the process to refine the analysis of certain effects.

In terms of the physical environment, the main effects have to do with soil, groundwater and surface water quality. Because of soil and groundwater contamination, measures must be implemented to avoid the spread of contaminants into the environment. As a large proportion of the construction work will take place in or near the water, a number of mitigation measures must be put in place to limit dispersal of suspended solids and contaminants in the water. Water quality will be monitored throughout the work to ensure that requirements are met. In short, the effects on the physical environment are considered non-significant once the proposed mitigation measures are taken into account. As for air quality and greenhouse gases, measures will be taken to mitigate the effects during the construction phase. For the operations phase, the changes in atmospheric emissions can be established at the subsequent design stages, once the supply and configuration of mass transit options is known.

During construction of the structures, there is a danger that wetlands along the riverbank will be disrupted. Measures must be taken to limit such losses and a compensation project for the ecological functions must be developed. Effects on the fish habitat, migratory birds and endangered species are expected during the construction and deconstruction phases. The project may result in the disruption, deterioration and loss of fish habitats that are deemed sensitive. A compensation program will be required to mitigate those effects, where applicable. Nesting of migratory birds may be disturbed during the work. Restriction periods will be in effect in order to minimize the disruptions. Species at risk (peregrine falcon and American eel) may also be impacted by the project. The peregrine falcon nesting site will have to be relocated, however the river currents near the work are not expected to prevent eel migration. Species with provincial

status are also found in the area. Specific measures will have to be taken to mitigate the effects on the brown snake, lake sturgeon, American shad, chain pickerel and rosyface shiner. Once the mitigation measures and compensation projects are taken into account, the effects on the biological environment are considered non-significant.

In terms of the human environment, the main effects are on the sound environment and archeology. The surrounding sound environment will be affected both by the construction work and by operation of the infrastructures. Considering the sensitive areas, noise mitigation measures are planned for both phases. A noise management program must be in place from the outset of the work in order to comply with requirements. Because there is a recognized archeological site at the foot of the bridge, measures will have to be taken to preserve the integrity of the remains. The environmental effects on the human environment are considered non-significant once the mitigation measures are taken into account.

An analysis of the cumulative effects and the effects of the environment on the project has also shown that the project does not have significant residual effects. An emergency response plan will also have to be implemented to limit the effects of accidents and malfunctions.

To ensure that environmental requirements are met, Transport Canada and the private partner will have to put in place an environmental management system, whereby monitoring and supervision of mitigation measures and the performance objectives set during the environmental assessment will be ensured, providing accountability, where necessary.

Based on the information contained in this report, the responsible authorities will be in a position to make a decision pursuant to subsection 20(1) of the CEAA.

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LIST OF ACRONYMS

AADT	Annual average daily traffic
AARQ	Atlas des amphibiens et des reptiles du Québec (Atlas of Amphibians and Reptiles of Quebec)
ACOA	Aire de concentration des oiseaux aquatiques (Waterfowl concentration area)
ADM	Aéroports de Montréal (Montreal Airports Authority)
AMQ	Association maritime du Québec (Quebec Marine Association)
AMT	Agence métropolitaine de transport (Montreal's Transportation Agency)
ASDT	Average summer daily traffic
BAnQ	Bibliothèque et Archives nationales du Québec (Quebec National Library and Archives)
BNQ	Bureau de normalisation du Québec
BRT	Bus rapid transit
CAP	Criteria air pollutants
CCDG	Cahier de charge et devis généraux
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CD	Chart datum
CDPNQ	Centre de données sur le patrimoine naturel du Québec (Quebec Natural Heritage Data Centre)
CEAA	*Canadian Environmental Assessment Act*, S.C. 1992, c. 37
CEAA (2012)	*Canadian Environmental Assessment Act*, S.C. 2012, c. 19, s. 52
CFE	Concentration of frequent effects
CHS	Canadian Hydrographic Service
CIS	Canadian Ice Service
CMM	Communauté métropolitaine de Montréal (Montreal Metropolitan Community)
CN	Canadian National
CNR	Canadian National Railway Company
COE	Concentration of occasional effects

COSEWIC	Committee on the Status of Endangered Wildlife in Canada
Ct	Total concentration
DBH	Diameter at breast height
DFO	Fisheries and Oceans Canada
DRTL	Dedicated rapid transit lane
EA	Environmental assessment
ÉPOQ	Étude des populations d'oiseaux du Québec (Study of Bird Populations in Quebec)
FHWA	Federal Highway Administration
GHG	Greenhouse gases
GPS	Global positioning system
GTR	Grand Trunk Railway System
ISAQ	Inventaire des sites archéologiques du Québec (Inventory of Archeological Sites in Quebec)
ISDM	Integrated science data management
ITS	Intelligent transportation system
JCCBI	Jacques Cartier and Champlain Bridges Incorporated
LAC	Library and Archives Canada
Leq_T :	Equivalent continuous noise level.
$L_{10\%}$:	The noise level reached or exceeded during 10% of the analysis period. The analysis period is 30 minute.
LQE	*Loi sur la qualité de l'environnement* (*Quebec Environment Quality Act*)
LRT	Light rail transit
MAMROT	Ministère des Affaires municipales, des Régions et de l'Occupation du territoire (Quebec Ministry of Municipal Affairs, Regions and Land Occupancy
MBS	Migratory bird sanctuary
MCCCF	Ministère de la Culture, des Communications et de la Condition féminine du Québec (Quebec Ministry of Culture, Communications and the Status of Women
MDDEP	Ministère du Développement durable, de l'Environnement et des Parcs (Quebec Ministry of Sustainable Development, Environment and Parks)
MDDEFP	Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (Quebec Ministry of Sustainable Development, Environment, Wildlife and Parks)
MEL	Minimal effect level

MRN	Ministère des Ressources naturelles (Quebec Ministry of Natural Resources)
MRNF	Ministère des Ressources naturelles et de la Faune (Quebec Ministry of Natural Resources and Wildlife)
MSL	Mean sea level
MTQ	Ministère des Transports du Québec (Quebec Ministry of Transport)
OME	Ontario Ministry of the Environment
$PM_{2.5}$	Fine airborne particulate matter less than 2.5 micron
PM_{tot}	Total airborne particulate matter
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PET-A	Pierre Elliott Trudeau Airport
PH	Petroleum hydrocarbons
RESIE	Rejet dans les eaux de surface et infiltration à l'égout (surface water outfall and sewer ingress)
RPCQ	Répertoire du patrimoine culturel du Québec (Cultural Heritage Inventory for Quebec)
SAE	Society for Automobile Engineers
SLSMC	St. Lawrence Seaway Management Corporation
SS	Suspended solids
TC	Transport Canada
TDG	Transportation of dangerous goods
TOC	Total organic carbon
VEC	Valued ecosystem/environmental component
VSP	Segments on piers
ZIP	Zone d'intervention prioritaire (priority intervention zone)

GLOSSARY

Abscissa:	Coordinate used to express the position of a point on the x-axis of a Cartesian coordinate system.
Abutment:	Support structure located at the end of a bridge which also links the structure to the land.
Air draught:	Vertical distance between the waterline and the highest point of a ship structure: the masthead.
Alluvial meadow:	Piece of land primarily comprised of sedimentary particles transported and deposited by running water (alluvium).
Anaerobic environment:	Environment totally devoid of oxygen.
Anthropic:	Relating to human activity.
Anuran:	Amphibian destitute of a tail in the adult form (e.g. frogs).
Aquatic plant community:	Sea or riverbed with vegetation.
Aquifer:	Geological formation that stores water temporarily or permanently.
Ash stand:	Area planted with ash trees.
Avian fauna:	See Avifauna.
Avifauna:	All species of birds in a given region.
Basal area:	The basal area of a stand of trees is the surface area of all cross-sections of the trunks of the trees over a hectare of forest, measured at 1.30 metres high. It is expressed in m^2/ha for tree stands and is calculated using a factor 2 forest prism.
Bathymetric chart:	A hydrographic map showing the contours of submerged areas of the sea floor or lake beds and sometimes riverbeds.
Bathymetry:	Measurement of water depths to determine the topography of sea or riverbeds.
Berm:	Bank developed at the bottom of a cut or fill slope to ensure its stability and potentially used for signage.
Biodiversity:	All living organisms in a given region considered in terms of variety of species, variability within each species and variability of ecosystems.
Bordering:	Located at the border of a country or region.
Buffer zone:	Controlled outlying area of an ecological reserve that serves as a transition between the reserve (partially or fully restricted) and the occupied space.
Calcicole:	Plant that grows well in calcium-rich or calcareous soil.

Cantilever:	Bridge whose main beams extend beyond and overhang and in turn support a shorter beam.
Catostomidae:	Family of freshwater fish closely related to minnows.
Centrarchidae:	Family of fish including types of sunfish.
Chlorophyll a:	Green pigment in plants, principal element in photosynthesis.
Chloride:	Combination of chlorine and another non-oxygen element.
Civil engineering structures:	Bridges and crossing structures.
Climate change:	Changes in climate that are directly or indirectly attributed to a human activity that alters the composition of the Earth's atmosphere and exacerbates the natural variability of the climate observed over comparable periods of time.
Coffer-dam:	Temporary dam used to allow work to be done below water level.
Conductivity:	Opposite of resistivity, measurement of which makes it possible to determine overall mineralization of water.
Cutaneous:	Relating to the skin.
Cyprinidae:	Family of freshwater fish including carp, barbel and chub.
Depth contour:	Contour line connecting points of equal water depth.
Diameter at breast height:	The diameter at breast height (DBH) of a tree trunk is measured at 1.30 metres above the ground
Deck:	Horizontal part of the frame of a bridge located beneath the roadway.
Downstream:	Occurring after the bridge, in the direction from which water is moving.
Draught:	Quantity or volume of water displaced by a ship.
Ecotoxicity:	Nature of a substance that is toxic to living organisms and their environment.
Expansion joint:	Joint between various parts of a structure to allow differential horizontal and vertical movements.
Factor 2 prism:	A factor 2 forest prism is a precise optical instrument designed especially to measure the basal area of a stand of trees. This measurement instrument is made of angled optical glass that bends light and produces an offset image. The number of trees offset is multiplied by a factor of two to obtain the basal area.
Fecal coliforms:	Bacteria of fecal origin.
Federal land:	Land that is the sole property of the State.
Fish fauna:	See Ichthyofauna.

Fish guild:	Group of fish species having the same need for a given activity, such as spawning or rearing.
Flat:	Piece of land that is relatively level, without a defined water flow network, forming a transition between a relief and a valley bottom or body of water.
Food chain:	Sequence of organisms in which each becomes food for an organism higher in the same sequence.
Forest litter:	Any organic plant matter, including litter and unincorporated humus, covering the mineral soil under forest vegetation.
Fyke net:	A net held in a tube by a few hoops that get smaller by degrees allowing the animal to reach the end, where it is held by cones that keep it from passing through.
Geomatics:	Discipline involving managing and using sciences and technologies to acquire, store, process and distribute geographic data.
Glacial till:	Deposit left by an unsolidified glacier.
Granulometric:	Expression of the distribution of a fragmented material into the various granulometric classes comprising it.
Hard water:	Water containing a great deal of calcium in bicarbonate form.
Heavy lift derrick:	Assembly of two or three poles whose lower ends are spread out and which are fastened at the upper ends to support a hoist for lifting heavy loads.
Herbaceous field:	Field dominated by natural herbaceous vegetation, may be used extensively or uncultivated.
Herpetofauna:	All reptiles and amphibians found in an area.
Heterogeneous:	Made up of elements differing in nature and form.
Hibernaculum:	Winter habitat of certain small animals and insects.
Hoist:	Lifting device that is usually suspended and serves to move loads vertically from a fixed or mobile position.
Hydraulic regime:	All variations in the state and characteristics of an aquatic formation that repeat regularly in time and space and go through cyclical (e.g. seasonal) variations.
Hydraulicity:	Relationship between the annual average flow (module) for one year and the module calculated over a longer period, designed to characterize the abundance of flow of running water for that particular year.
Hydrodynamic regime:	All of the sedimentary parameters, e.g.: erosion, transportation of solid matter and sedimentation, that change according to the season, flow, tides, wind and ice.
Hydrogeological:	Related to hydrogeology, the circulation of water in the subsoil.

Hydrographic chart:	A chart primarily designed to show the topography of a submerged area of land, but also generally showing above-water elements.
Hydrometric station:	A facility for measuring elevation and a section for measuring flow of a channel.
Ice control structure:	The Champlain Bridge ice control structure is a structure located upstream of and parallel to the bridge which controls the formation of ice jams in the La Prairie Basin and thus facilitates shipping.
Ice jam:	Obstruction of a watercourse by an accumulation of ice.
Ichthyofauna:	All species of fish forming a population.
Iconographical:	Relating to the study of artistic representations of a subject, sometimes using various media (painting, sculpture, etc.).
Invertebrate:	Animals that do not have a spinal column, such as insects and molluscs.
Jetty:	Construction forming a roadbed extending into the water in order to provide access to a work site or the other riverbank.
Juvenile:	Animal below reproductive age, distinguished from adults by its external features.
Lacustrine:	Of or relating to lakes.
Laminar:	Characterizing a flow that is not turbulent.
Launching equipment:	Temporary steel structures used to guide a civil engineering structure during launching.
Lentic:	Characterizing freshwater in which the water circulates slowly or not at all (lakes, ponds, canals, etc.).
Leq_T :	Equivalent continuous noise level. This parameter corresponds to the level of continuous noise with the same sound energy as discontinuous noise during a time interval (T). It therefore makes it possible to take into account dynamic fluctuations in noise level. The parameter is largely used in environmental noise, because noise sources are often variable, such as the noise generated by vehicles travelling over highway infrastructures.
$L_{X\%}$:	Statistical noise parameters. Statistical analysis makes it possible to measure variations in noise levels for an analysis period. The statistical values are usually indicated as a percentage of the measurement period. The values commonly used are: L1%, L10%, L50%, L90%, L95% and L99%. For instance, L1% is the noise level reached or exceeded during 1% of the analysis period, i.e. for 1% of the time, the noise level was above this value and for 99% of the time, the noise level was below that value.
Lithic:	Containing debris from rocks (generally crystalline) recognizable as rocks.

Lithopelagic species:	Species that spawn on a substrate of coarse sand, gravel or rock, whose eggs or larvae become pelagic as they develop.
Lithophile:	Describes chemical elements that have a great affinity for oxygen and halogens that are preferably found in the lithosphere.
Lithophilous species:	Species that spawn on a coarse substrate (gravel, rock, blocks) or in fast-flowing water.
Low-water period:	Period when the minimum level of a watercourse is observed.
Macrophyte:	Large aquatic plant.
Median:	In a series of data in order of size, the figure in the middle of the series, dividing the two series in equal halves.
Multi-use path:	Lane intended for use by cyclists, pedestrians, roller-bladers and others using non-motorized forms of transportation on a dedicated site or separated from motor traffic by a physical barrier.
Navigation clearance:	Maximum space provided by a navigable waterway for passage of vessels.
Nitrate:	Common name for sodium nitrate.
Nitrite:	Salt of nitrous acid.
Noise barrier:	Screen of varying compositions that make it possible to reduce noise levels perceived.
Organochlorine:	A chlorine derivative product.
Ornithological:	Relating to the study of birds.
Orthophosphate:	Phosphorus compound (acid or salt) characterized by the following radicals: $H2PO4^{-1}$, $HPO4^{-2}$ and $PO4^{-3}$.
Palustrine:	Relating to marshes or marsh-like environments.
Pelagic species:	Species that spawn in the water column.
Percidae:	Member of a family of bony fish such as perch.
Photo-interpretation:	Thematic study of an aerial or space-based image, photographic or non-photographic, carried out based on a previous analysis of information obtained photo-identification.
Physicochemical:	Relating to physicochemistry, the science of the physical and chemical properties of matter.
Phytolithophilous species:	Species that spawn on varied material beds, organic or not, with vegetation present.
Pier:	Intermediate supports of a bridge’s deck.
Piezometric contour:	Contour line joining points in which the groundwater table is the same altitude.

Plankton community:	Community of all microscopic organisms suspended in sea or freshwater.
Poplar stand:	Area planted with poplar trees.
Portal cap beam:	Horizontal piece at the top of one or more posts and serving to support the deck of a bridge.
Prestressed concrete:	Concrete cast around tensioned steel cables placed under permanent stress in the opposite direction of that of the loads that will be applied to it.
Private partner:	Company that takes responsibility for completing and operating the New Bridge for the St. Lawrence. The private partner will be supported by contractors during the construction period.
Rearing habitat:	Habitat in which fish larvae (fry) absorb their yolk sac and move into another development stage.
River sand:	Sand carried by a watercourse, characterized by specific forms related to transportation capacity, erosion and sedimentation of the watercourse.
Roundabout:	Intersection in which traffic flows in a continuous circle in one direction around a central island.
Sapropel:	Fine sediment containing organic matter that is transformed by the action of anaerobic bacteria in the reducing environment formed by calm water depths, which produces methane and hydrogen sulphide in particular.
Scrubland:	Vegetation dominated by shrubs greater than 10 cm in height.
Sedimentation hydrodynamics:	Movement of sedimentary particles caused by a waterway (saltation, sedimentation, traction, etc.).
Segment:	Part of a prestressed concrete structure built using balanced cantilevers.
Seismic analysis:	Analysis relating to earthquakes.
Sheet pile:	Wood, steel or concrete piece in thin sections with grooves enabling them to be interlaced.
Silicate:	Silica in combination with various metallic oxide minerals.
Silt:	Very fine moving detrital sediment or mineral of organic/mineral origin with grains less than 0.06 mm in diameter.
Snake cover board:	Cover made of shingles and used to inventory reptiles and amphibians.
Spawning area:	Area of an aquatic environment where spawning and fertilization of the eggs of an animal species takes place.
Spawning ground:	An aquatic area where a species of fish lays and fertilizes its eggs.

Special status species:	Species protected under the *Species at Risk Act* or the *Loi sur les espèces menacées ou vulnérables*.
Standard deviation:	Measure of the dispersion of a set of data in relation to the mean.
Stratigraphic:	Relating to stratigraphy, the study of layers of the Earth's crust.
Substrate:	Layer that serves or once served as a support.
Survey:	In the archeological sense, a local exploration technique used in an area to detect the presence of relevant and useable elements from a historical standpoint.
Terrestrial herbaceous graminoid:	Land-based plant of the grass family.
Topography:	Configuration of the land surface.
Toponymy:	Relating to the study of the origin and form of place names.
Transect:	Narrow line or strip that crosses a given environment, along which are located observation, measurement or sampling stations that make it possible to analyze, profile or map the environment.
Tributary:	Watercourse that empties into a larger watercourse or lake.
Turbidity:	Characteristic of water with reduced transparency due to the presence of fine suspended particles of natural origin or due to pollutants.
Typology:	Systematic classification of individuals according to certain physical or behavioural characteristics.
Underwashing:	Process of erosion of the soil forming the bed of a watercourse, which intensifies during high-water periods, particularly beneath bridge piers.
Unwatered:	Removed from or above water (a place previously inundated).
Upstream:	Occurring before the bridge, in the direction from which water is moving.
Water table:	Surface level of groundwater with or without flow from the outside.
Wind erosion:	Change in the landform caused by the wind.

BACKGROUND

Part II of the Environmental Assessment

This report forms the second part of the environmental assessment. Section 5 describes the public and First Nations consultation process. Section 6 presents the methodology used to assess the environmental effects. Section 7 includes an analysis of the environmental effects of the project and identifies mitigation measures. The other effects of the project are presented in Section 8, while Section 9 describes the environmental management plan for the project. In Section 10, we identify future environmental studies that are felt to be relevant as the project moves ahead. Lastly, Section 11 provides a summary of effects and mitigation measures by environmental component.

Part I of the environmental assessment provided the background and description of the project and a description of the environment.

Two summary reports also provide a synthesis of each of the parts.

Approach

Given the progress on the New Bridge for the St. Lawrence project design, the responsible authorities decided to adopt an objective-based approach to carrying out the environmental assessment.

An objective-based environmental assessment makes it possible to adapt the project when details are not yet defined or will be determined at a later date. The objectives are identified as design and performance criteria in Section 7 of this report.

Legal framework

The new *Canadian Environmental Assessment Act (2012)*, S.C. 2012, c. 19, s. 52 (CEAA (2012)) was enacted on June 29, 2012 and came into effect on July 6, 2012. The CEAA (2012) offers an updated, modern approach that responds to Canada's current economic and environmental context. It implements central elements of the Government's plan for Responsible Resource Development to modernize the regulatory system and allow for natural resources to be developed in a responsible and timely way for the benefit of all Canadians (Canadian Environmental Assessment Agency, 2012). It focuses on federal areas of jurisdiction and consequently on the potential adverse environmental effects that are within federal jurisdiction. Projects falling under CEAA (2012) for the purposes of environmental assessment are generally those that are "designated" by the Act.

On July 6, 2012, the Minister for the Environment designated the New Bridge for the St. Lawrence project, on which the environmental assessment process had begun under the former *Canadian Environmental Assessment Act*, S.C. 1992, c. 37 (CEAA), pursuant to subsections 14(2) and 124(2) of CEAA (2012). The environmental assessment was therefore carried out under the CEAA.

Next steps of the process

Completion of the environmental assessment does not mean that environmental concerns are resolved. Throughout the next phases of the project, additional environmental studies will be conducted as required in order to clarify the environmental effects and refine the mitigation measures. The need for additional studies is presented in Section 10.

5 INFORMATION SESSIONS / PUBLIC AND FIRST NATIONS CONSULTATION SESSIONS

5.1 PUBLIC AND FIRST NATIONS CONSULTATION APPROACH

As part of the New Bridge for the St. Lawrence project screening process, the responsible authorities determined that public participation was desirable pursuant to subsection 18(3) of the CEAA. Thus, members of the public were given a number of opportunities to express their concerns.

An initial consultation was held from March 15 to April 4, 2012, to collect comments from the public regarding the draft environmental assessment guidelines for the project.

The public was consulted again in December 2012 at six "open house" information sessions held in Brossard, Verdun and Nuns' Island. The sessions, hosted by Transport Canada, were designed to inform and consult the public, specifically the residents immediately affected, regarding the project description and the physical, biological and human environments. At the same time, Transport Canada collected concerns from the public via the Canadian Environmental Assessment Registry until January 15, 2013.

In addition, a meeting between the Kahnawake Mohawk Council and Transport Canada was held in October 2012 to present the project and the environmental assessment process. Further meetings are possible until the end of the environmental assessment.

This report will also be subject to public consultations in the spring of 2013. Concerns raised at this time will be incorporated into the screening report.

5.2 CONCERNS RAISED

Because the responsible authorities felt that public participation in the screening process was required under subsection 18(3) of the CEAA, they are required to take public comments into consideration before making a decision under subsection 20(1) of the Act. The following sections provide a summary of the concerns raised during the consultation periods. All of the concerns raised and the position of the responsible authorities in relation to the concerns are found in Appendix 1.

5.2.1 Environmental assessment guidelines

During the consultations, the public raised some concerns about the draft environmental assessment guidelines. The concerns centred on five themes:

- Human health;
- Automobile traffic and related consequences;
- Modal shift;
- Contaminated soil and sediment;
- Other options for new bridge construction.

These concerns were taken into account in developing the final version of the guidelines.

5.2.2 Primary concerns regarding the environmental assessment

The main concern raised by the people residing in the vicinity of the New Bridge for the St. Lawrence was without a doubt the impact of noise, during both construction and operations.

During construction, residents are worried about the constant noise of heavy machinery as well as the potential failure to comply with current standards. During bridge operations, they are worried that the new bridge will see an increase in traffic and that there will therefore be an increase in noise from automobile and heavy truck traffic.

The second concern raised was regarding air quality, in particular an increase in dust.

5.2.3 Aspects outside the scope of the environmental assessment

A number of topics of interest unrelated to the scope of the environmental assessment but directly related to construction of the New Bridge for the St. Lawrence were raised. They were:

- Mass transit and active transportation;
- Method of construction: new construction or refurbishing;
- Bridge architecture;
- Tolls;
- Method of management: public-private partnership or public management;
- Bicycle path (*Route verte*).

Mass transit

Mass transit is a priority for everyone. The participants wanted to have more information about the proposals being considered or studied.

Method of construction

Some people are worried that construction of a new bridge would be more bothersome than refurbishing the existing bridge, particularly due to the noise from pile driving over long periods.

Architecture

A number of people indicated that the bridge should make an architectural statement so that it forms a local landmark and an international reference point.

Tolls

Tolls are an issue for people who use the Champlain Bridge every day. They worry about the price of crossing and the method of payment. Older individuals recall when the tollbooths slowed traffic. The public, particularly residents of the South Shore, are strongly opposed to charging a toll.

Method of management

People wondered what type of management method Transport Canada would adopt for the bridge construction and management. There was fear that a public-private partnership (PPP) would lead to excessive, unjustified costs designed to line the pockets of private interests.

Route verte

Some people expressed a desire to see the existing bridge kept and converted into a bicycle path.

6 METHOD OF ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 ASSESSMENT METHODOLOGY

6.1.1 Identification and assessment of effects

The methodological approach used to assess environmental effects includes two main phases, namely, identification and assessment of potential effects.

Identification of potential effects consists in identifying the components of the physical, biological and human environments that are likely to be impacted by the project's activities. It is conducted using an interaction grid. The valued environmental components are shown on the y-axis of the grid and the project activities on the x-axis.

The subsequent **assessment of potential effects** consists of defining the scope of the effects associated with project execution. The significance of an effect on a component of the environment is based on three parameters, intensity, duration and scope.

The three parameters are assessed using the definitions given below in Section 6.1.2 and the multicriteria matrix shown in Table 67.

Finally, the significance of the residual effects is assessed, taking into account the application of mitigation measures.

6.1.2 Determining the significance of an environmental effect

6.1.2.1 Intensity of the effect

The intensity of the effect refers to the level of disruption to the component. Three levels have been defined:

Low: Little change in the characteristics of the component. Difficult to quantify;

Average: Change in certain characteristics of the component. The change may be quantifiable;

High: Change in all or in the main characteristics of the component. The change is quantifiable.

6.1.2.2 Duration of the effect

Duration means the time dimension of the effect. The terms *permanent*, *temporary* and *short* are used to describe the period of time:

Short-lived: the effect disappears promptly;

Temporary: the effect is felt during one project activity or, at most, throughout implementation of the project;

Permanent: the effect has repercussions for the life of the infrastructure.

6.1.2.3 Scope of the effect

The scope describes the spatial dimension of the effect caused by an action in the environment. It refers to the distance or area covered by the disruption. The terms regional, local and limited are used to describe the scope:

Limited: the scope is limited when the action affects only one environmental element located near the project;

Local: the scope is local when the action affects the study area;

Regional: the scope is regional when the action affects areas beyond the study area.

6.1.2.4 Assessment of the potential effect

These three parameters are incorporated into a multicriteria matrix, making it possible to place the potential effect into one of three categories:

Major (MAJ): signifies an effect that is permanent and that affects the integrity, diversity and sustainability of the element. Such an effect substantially or irremediably alters the quality of the environment.

Medium (MED): signifies a perceptible, temporary and/or low-return effect that has little impact on the environmental component and is not irreversible. Such an effect is short-lived and/or limited in scope.

Minor (MIN): signifies that the effect is non-existent or virtually non-existent, that it does not affect the environmental component in any observable or quantifiable way and that it is related to a randomly occurring natural effect. As a rule, this would be a short-lived effect, limited in scope.

Table 67 Multicriteria analysis to determine the potential effect

Intensity	Duration / Scope	Short-lived	Temporary	Permanent
Low	Limited	MIN	MIN	MED
	Local	MIN	MIN	MED
	Regional	MIN	MED	MAJ
Average	Limited	MIN	MED	MED
	Local	MED	MED	MAJ
	Regional	MED	MAJ	MAJ
High	Limited	MED	MAJ	MAJ
	Local	MED	MAJ	MAJ
	Regional	MAJ	MAJ	MAJ

MIN: Minor; MED: Medium; MAJ: Major

6.1.3 Mitigation measures

The CEAA defines mitigation as:

The elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means (CEAA).

Once the environmental effects have been identified and assessed, mitigation measures are established in order to mitigate the medium and minor effects. These measures are intended to decrease or correct the negative effects so that the project is incorporated into the environment as smoothly as possible.

6.1.4 Residual effects

The mitigation measures will then enable a reassessment of the extent of the environmental effects, which then become residual environmental effects, namely, those that remain once the mitigation measures have been applied. Following the application of mitigation measures, significant or non-significant residual effects may remain:

Non-significant: signifies a residual effect that is temporary and/or low-return, short-lived and/or limited in scope, and has little or no impact on the environmental component.

Significant: signifies, that despite mitigation measures, the residual effect has a permanent impact on the environmental component.

7 ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

Under subsection 16(1) of the CEAA, screening of a project includes consideration of the following factors:

(*a*) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

(*b*) the significance of the effect referred to in paragraph (*a*);

(*c*) comments from the public that are received in accordance with this Act and the regulations;

(*d*) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;

(*e*) any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered.

The scope of the factors to be taken into consideration pursuant to paragraphs 16(1)(*a*), (*b*) and (*d*) is to be determined by the responsible authorities (CEAA subsection 16(3)).

The terms "environment" and "environmental effect" are defined respectively as follows:

- "environment" means the components of the Earth, and includes:
  (*a*) land, water and air, including all layers of the atmosphere;
  (*b*) all organic and inorganic matter and living organisms;
  (*c*) the interacting natural system that include components referred to in paragraphs (*a*) and (*b*).
- "environmental effect" means, in respect of a project,
  (a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residence of individuals of that species, as those terms are defined in subsection 2(1) of the Species at Risk Act,
  (b) any effect of any change referred to in paragraph (a) on
  (i) health and socio-economic conditions,
  (ii) physical and cultural heritage,
  (iii) the current use of lands and resources for traditional purposes by aboriginal persons, or
  (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or

(c) any change to the project that may be caused by the environment,
whether any such change or effect occurs within or outside Canada.

Section 7 essentially covers paragraphs 16(1)(a), (b) and (c). The effects of malfunctions or accidents, cumulative effects and effects of the environment on the project are presented in Section 8. Lastly, Section 8 also includes the proposed approach for assessing GHG once project details have been more clearly defined.

7.1 IDENTIFICATION OF THE POTENTIAL EFFECTS OF THE PROJECT

Potential effects were identified using the grid shown in Table 68. The environmental components that have been described (see Section 4 for the description of environmental components) are shown on the y-axis of the grid and the sources of impact associated with the various phases of the project on the x-axis. Table 69 sets out the impact sources and the interaction between them and the components of the project using the following identification scheme:

- A: Reconstruction and expansion of Highway 15;
- B: New Nuns' Island bridge;
- C: Work on Nuns' Island;
- D1a: Crossing the Greater La Prairie Basin;
- D2: Crossing the Seaway;
- D1b: Crossing the Lesser La Prairie Basin;
- E: Alignment with Highway 10;
- F: Demolition of existing Champlain Bridge and Nuns' Island Bridge.

The project components are described in Part I of the Environmental Assessment Report, Section 3.

The identification of potential effects takes into account the following elements:

- The project’s technical characteristics and proposed working methods as determined at this stage of the process;
- Knowledge of the environment;
- Lessons learned from similar projects;
- Environmental concerns associated with the project.

Table 68 Grid displaying the interaction between environmental components and the project

ENVIRONMENTAL COMPONENT		PRE-CONSTRUCTION			CONSTRUCTION						POST-CONSTRUCTION					OPERATIONS		DEM.
		Site mobilization and construction of temporary facilities	Maintenance of traffic and shipping and installation of signage	Relocation and protection of public utility infrastructures	Land clearing and soil stripping	Excavation, earthwork	Construction of infrastructure	Work in aquatic environments	Management of waste and hazardous materials	Transportation, operation and maintenance of machinery	Deconstruction of structures	Demobilization of construction site and dismantling of temporary facilities	Work in aquatic environments	Management of waste and hazardous materials	Transportation, operation and maintenance of machinery	Presence and use of infrastructure	Maintenance and repair of infrastructure	Deconstruction of infrastructures
Physical environment																		
Soil and sediment quality		x		x	x	x		x	x	x		x	x	x	x			x
Surface water quality		x			x	x		x	x	x	x	x	x	x	x		x	x
Hydrology and hydraulics								x					x					
Groundwater quality		x		x		x		x	x	x		x	x	x	x		x	x
Air quality and GHG		x	x			x				x	x			x	x	x	x	x
Biological environment																		
Vegetation	Terrestrial	x			x													
	Aquatic							x					x					x
	Wetlands			x	x	x												
Ichthyofauna and habitats					x	x		x	x	x	x		x			x	x	x
Herpetofauna and habitats		x			x			x			x		x			x		
Avifauna and habitats		x			x			x			x		x			x		x
Mammals					x													
Special status species		x			x			x			x		x			x		x
Human environment																		
Land and buildings		x	x	x		x												
Infrastructures			x	x		x	x			x	x						x	x
Commercial ship traffic			x			x	x	x			x		x				x	x
Recreational / tourist activities and recreational boating		x	x	x	x		x				x		x		x	x	x	x
Sound environment		x	x							x					x	x		x
Heritage and archeology					x	x	x									x		x
Aesthetic and visual aspects											x					x		
Land and buildings																		

Table 69 Relationship between project components and activities identified in the effect identification grid

ACTIVITIES	DESCRIPTION	COMPONENTS[1]							
		A	B	C	D1A	D2	D1B	E	F
PRE-CONSTRUCTION PHASE									
Site mobilization and construction of temporary facilities	► Installation of construction trailers, sanitary services and hook-ups ► Installation of work areas and areas for storage of materials, waste disposal and prefabricated components ► Installation of temporary production areas as required (concrete plant, etc.) ► Development of launch and assembly areas ► Construction of temporary access roads, parking areas and, as required, jetties, a pile-supported bridge, floating bridge and/or temporary pier	x	x	x	x	x	x	x	x
Traffic and navigation maintenance, installation of signage	► Rerouting and closure of traffic and bicycle lanes ► Rerouting and closure of recreational boating lanes ► Installation of signage	x	x	x	x	x	x	x	x
Relocation and protection of public utility infrastructures	► Electrical power lines (high and low voltage) ► Transmission lines (telephone, cable, fibre optic) ► Underground pipes (all types)	x	x	x	x	x	x	x	x
CONSTRUCTION PHASE									
Soil stripping and land clearing	► Land preparation activities ► Land clearing ► Surface stripping ► Topsoil storage	x	x	x	x	x	x	x	
Excavation, earthwork	► Excavation and excavated material ► Contaminated soil and sediment management ► Water and wastewater segregation ► Fill and earthworks ► Maintenance of the seaway dike's water-tightness	x	x	x	x	x	x	x	

[1] Components refer to Figure 3 in Part I. For ease of reading, this figure is reproduced in Appendix 2 of this report.

Table 69 (Cont'd) Relationship between project components and activities identified in the effect identification grid

ACTIVITIES	DESCRIPTION	COMPONENTS							
		A	B	C	D1A	D2	D1B	E	F
Construction of infrastructures	▸ Road construction ▸ Construction of overpasses ▸ Bridge construction (excluding in-water work) ▸ Construction of abutments and bridge decks	x	x	x	x	x	x	x	
Work in aquatic environments	▸ Construction of temporary structures (cofferdams, jetty, etc.) ▸ Piledriving ▸ Installation of foundations, bridge footings and piles ▸ Interventions in the Aqueduct Canal	x	x		x	x	x		
Management of waste and hazardous materials	▸ Management of unused excavated material ▸ Waste management ▸ Hazardous waste management	x	x	x	x	x	x	x	
Transportation, operation and maintenance of machinery	▸ Movement of machinery, vehicles and barges ▸ Maintenance of vehicles and machinery ▸ Transportation of materials by road and river ▸ Lighting during the work	x	x	x	x	x	x	x	
POST-CONSTRUCTION PHASE									
Deconstruction of structures	▸ Dismantling of steel structures ▸ Dismantling of concrete structures ▸ Deconstruction of administrative centre/plaza ▸ Crushing of debris								x
Demobilization of work site and dismantling of temporary facilities	▸ Dismantling of temporary facilities ▸ Restoration of storage areas ▸ Site restoration	x	x	x	x	x	x	x	x

Table 69 (Cont'd) Relationship between project components and activities identified in the effect identification grid

ACTIVITIES	DESCRIPTION	CompoNEnts							
		A	B	C	D1A	D2	D1B	E	F
Work in aquatic environments	► Removal or cutting of piles from existing bridges ► Management of sawing mud ► Dismantling of temporary structures in aquatic environments								x
Management of waste and hazardous materials	► Management and disposal of residual materials and debris ► Hazardous waste management (lead, asbestos)								x
Transportation, operation and maintenance of machinery	► Circulation of machinery and vehicles ► Maintenance of machinery and vehicles ► Transportation of debris by land and water ► Lighting during construction work	x	x	x	x	x	x	x	x
Operations phase									
Presence and use of infrastructure	► Traffic supervision and management ► Vehicular traffic ► Presence of mass transit corridor ► Active transportation ► Street furniture (lighting of structures)	x	x	x	x	x	x	x	
Infrastructure maintenance and repair	► Repair of engineering structures ► Use of de-icing salt (traffic and active transportation) ► Snow removal and loading	x	x	x	x	x	x	x	
Decommissioning phase									
Deconstruction of structures at the end of their useful life	► Mobilization of job site ► Dismantling of structures ► Traffic management ► Debris management	x	x	x	x	x	x	x	

7.2 ASSESSMENT OF POTENTIAL PROJECT EFFECTS

7.2.1 Analysis of environmental effects and mitigation measures

Table 70 provides the analysis of potential environmental effects, the required mitigation measures and an assessment of the residual effects that may remain after mitigation measures have been applied during execution of the New Bridge for the St. Lawrence project.

The mitigation measures identified in Table 70 have been divided into four categories:

- Design criteria, which will be considered and incorporated when the plans and specifications for the structures are developed, identified by “CC” in Table 70. A discussion of these criteria is presented in Section 7.3.
- Performance criteria, for which the objectives are defined, identified by “PC” in Table 70. The general guidelines for the monitoring program are presented in Section 9.8.
- Standard mitigation measures, taken from industry standards and government guidelines. These measures are identified with the acronyms “DFO”, “CCDG” and “NC” in Table 70 and also itemized in Section 7.4.
- Specific mitigation measures, identified with an “S” in Table 70 and also itemized in Section 7.4.

All the mitigation measures may be refined during the major phases of the project in order to take into account specific features of each of the components and the work methods. Thus, the design criteria will be incorporated at the preliminary design and feasibility study phase, as well as the preliminary engineering and specifications preparation phase. The performance criteria will be incorporated at the preliminary engineering and specifications preparation phase. All of the mitigation measures will be provided to bidders at the tendering phase to enable them to identify their preferred approach.

When the final plans and specifications are being prepared by the bridge builder, an additional review of the mitigation measures will be performed to ensure that the builder's planned work methods are able to meet the objectives and measures set out in this environmental assessment. Furthermore, it is possible that new measures may have to be added when the permits are being issued for the project.

Application of a monitoring protocol, the general guidelines of which are set out in Section 9 of this document, will make it possible to ensure that a) the mitigation measures are in fact in place and b) the performance criteria are being met.

It should be noted that at the decommissioning phase of the New Bridge for the St. Lawrence and the New Bridge for Nuns' Island at the end of their useful lives, the same effects as those expected during the post-construction phase are likely to occur.

Table 70 Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES[2]	SIGNIFICANCE OF RESIDUAL EFFECTS
1.	Pre-construction	Site mobilization and construction of temporary facilities	Recreational / tourist activities and recreational boating	Bike path corridors and some riverfront areas used for recreational / tourist activities (wading, windsurfing, hunting, etc.) used for some pre-construction activities.	High	Temporary	Local	Major	S-1 As far as possible, keep a cycling link open during the official opening period between the South Shore and Montreal. S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
2.	Pre-construction	Site mobilization and construction of temporary facilities	Avifauna and habitats	Disturbance of avifauna habitat during construction of temporary facilities.	Average	Temporary	Local	Medium	S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area.	Non-significant
3.	Pre-construction	Site mobilization and construction of temporary facilities	Sound environment	Site mobilization activities may increase noise levels in sensitive areas identified in figures 80, 81 and 82 in Part I of the Environmental Assessment Report (see summary in figure 84).	Average	Temporary	Local	Medium	PC-1 Noise levels associated with site mobilization activities must not exceed the following thresholds: $L_{10\%}$ = 75 dbA during daytime; ambient noise +5 dbA during evening and night (measured at 5 m from sensitive areas). Where these thresholds cannot be met, mitigation measures must be implemented, such as: - NC 9.9.3.1 - NC 9.9.3.2 - NC 9.9.3.3. S-4 Where feasible, permanent noise barriers will be built before the start of work.	Non-significant
4.	Pre-construction	Site mobilization and construction of temporary facilities	Special status wildlife and plant species	Potential mortality of individuals and disturbance of brown snake habitat on Montreal Island, Nuns' Island and the Seaway dike.	High	Temporary	Limited	Major	S-5 In the spring, install a fence along the construction perimeter (exclosure) and maintain it for the duration of the work. S-6 At the end of summer and before the start of work, capture brown snakes found on the exclosure and relocate them in suitable habitats outside the site. Relocation should be discussed with the appropriate authorities (MDDEFP).	Non-significant
5.	Pre-construction	Site mobilization and construction of temporary facilities	Herpetofauna and habitats	Potential mortality of individuals and disturbance of herpetofauna habitat during construction of temporary facilities in the Nuns' Island and seaway dike bridge sectors.	Average	Temporary	Limited	Medium	NC 9.5.3 S-5 In the spring, install a fence along the construction perimeter (exclosure) and maintain it for the duration of the work. S-7 As far as possible, avoid work in wetlands suitable for herpetofauna (Nuns' Island Bridge and Seaway Dike) or minimize work in these environments.	Non-significant
6.	Pre-construction	Site mobilization and construction of temporary facilities	Mammals	Mammal disturbance in the construction footprint.	Low	Temporary	Local	Minor	No special measures with respect to the species on the site; individual animals disturbed by the work should be able to move out of the affected areas.	Non-significant

[2] CC-n: Design Criteria; PC-n: Performance Criteria; MPO-n: DFO Standard Measures; CCDG-n: MTQ General Specifications and Standards (2012a); NC-n: MTQ Roadwork Standards (2013b); S-n: Specific Measures

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
7.	Pre-construction	Site mobilization and construction of temporary facilities	Air quality	Construction of temporary facilities may produce a short-term degradation of air quality due to fugitive dust, some of which may contain contaminants.	Average	Temporary	Local	Medium	PC-2 Do not exceed a threshold of 30 µg/m^3 for fine airborne particulate matter less than 2.5 microns in diameter over a 24 hr. average (PM 2.5 24 hr. average) and an average concentration of total particulate matter over 24 hr. of 120 µg/m3 at 50 m from the footprint. Where these thresholds cannot be met, mitigation measures must be implemented, for example: - Use equipment fitted with dust collection systems. - Install tarpaulins around work that generates dust. - Cover piled materials with geotextile. CCDG 12.4 S-8 When working in urban areas, remove loose material and other debris from streets used by vehicles and machinery on a daily basis.	Non-significant
8.	Pre-construction	Site mobilization and construction of temporary facilities	Surface water quality	Potential increase in SS concentrations in surface water due to sediment disturbance in the Lesser La Prairie Basin. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Temporary	Regional	Major	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-8.	Non-significant
9.	Pre-construction	Site mobilization and construction of temporary facilities	Surface water quality	Potential contamination of the waters of the St. Lawrence River due to soil run-off from disturbed areas. Potential increase in suspended solid (SS) concentrations in surface water. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Temporary	Local	Medium	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-8, MPO-11, MPO-13 CCDG 10.4.3.1, 10.4.3.2.1, 10.4.3.2.2 et 10.4.3.2.3 NC 9.4.3.1	Non-significant
10.	Pre-construction	Site mobilization and construction of temporary facilities	Groundwater quality	Accidental oil or fuel spills when transporting construction materials or during site mobilization could affect groundwater quality.	Average	Temporary	Limited	Medium	S-9 Maintain transportation vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous emissions and noise. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log.	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
11.	Pre-construction	Site mobilization and construction of temporary facilities	Soil and sediment quality	Oil or fuel spills during site mobilization could affect soil and sediment quality.	Low	Temporary	Limited	Medium	S-9 Maintain transportation vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous emissions and noise. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-11 Ensure that catalytic converters on all vehicles are in proper working order throughout the construction period. S-12 Ensure that contractors and sub-contractors are made aware of environmental concerns including air quality.	Non-significant
12.	Pre-construction	Site mobilization and construction of temporary facilities	Soil and sediment quality	Excavation, fill and grading activities carried out in aquatic environments (wharf/jetty/other) during site mobilization could result in dispersion of contaminated sediments.	High	Temporary	Limited	Major	MPO-4 and MPO-5	Non-significant
13.	Pre-construction	Site mobilization and construction of temporary facilities	Soil and sediment quality	Site mobilization and construction of temporary facilities may lead to soil exposure and increased erosion.	Low	Temporary	Limited	Medium	MPO-6, MPO-8 CCDG 10.4.3.2.2 and 10.4.3.5 NC 9.4.3.1, 9.4.3.2 and 9.4.3.3 S-13 Isolate and preserve the organic soil layer so that it may be reused in places where the topsoil has been stripped.	Non-significant
14.	Pre-construction	Site mobilization and construction of temporary facilities	Land and buildings	Possible encroachment on private land for construction of materials storage areas.	Average	Temporary	Limited	Medium	CCDG 7.11 S-14 Minimize encroachment of detours on private land. The private partner must come to an agreement with property owners with respect to encroachment on private land.	Non-significant
15.	Pre-construction	Site mobilization and construction of temporary facilities	Terrestrial vegetation	Possible loss of terrestrial and riparian vegetation due to organization of materials storage areas and access roads. The surface area will vary depending on the private partner's working methods.	Average	Temporary	Limited	Medium	CCDG 11.2.5, 11.2.6 and 11.2.7.1	Non-significant
16.	Pre-construction	Traffic and navigation management, installation of signage	Recreational/tourist activities and recreational boating	Detours, closures and temporary changes to boat lanes and bike paths.	Average	Temporary	Local	Medium	S-15 Install the materials required to mark boat lanes and bike paths in order to ensure safe passage of cyclists and recreational boaters.	Non-significant
17.	Pre-construction	Traffic management, installation of signage	Sound environment	Detours may result in changes to noise levels in residential neighbourhoods near the route in the boroughs of Verdun and Sud-Ouest.	High	Temporary	Local	Major	PC-1 Noise levels associated with site mobilization activities must not exceed the following thresholds: $L_{10\%}$ = 75 dbA during daytime; ambient noise +5 dbA during evening and night (measured at 5 m from sensitive areas). Where these thresholds cannot be met, mitigation measures must be implemented, such as: - NC 9.9.3.1 - NC 9.9.3.2 - NC 9.9.3.3.	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
18.	Pre-construction	Traffic management, installation of signage	Infrastructure	Temporary lane changes (A-10, A-15, Route 132 and municipal network) and partial closures of some accesses.	High	Temporary	Regional	Major	CCDG 10.3.1 and 10.3.4.3 S-16 The public will be informed of the work and the detours provided. Alternate routes will be proposed. S-17 At least one, preferably two, accesses to Nuns' Island local network will be maintained at all times on the local road and highway network.	Non-significant
19.	Pre-construction	Traffic and navigation management, installation of signage	Commercial ship traffic	Impact on commercial ship traffic on the St. Lawrence Seaway.	High	Temporary	Regional	Major	S-18 Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner.	Non-significant
20.	Pre-construction	Traffic management, installation of signage	Air quality	Traffic lane diversions (A-15 and municipal network) may result in a local change in air quality in residential neighbourhoods near the route in the boroughs of Verdun and Sud-Ouest.	Average	Temporary	Local	Medium	S-19 Set up a system to monitor atmospheric contaminants in nearby residential areas (Verdun, Sud-Ouest, Nuns' Island and Brossard) during construction work.	Non-significant
21.	Pre-construction	Traffic management, installation of signage	Land and buildings	Possible encroachment on private land for bypass roads.	Low	Temporary	Limited	Minor	CCDG 7.11 S-14 Minimize encroachment of detours on private land. The private partner must come to an agreement with property owners with respect to encroachment on private land.	Non-significant
22.	Pre-construction	Relocation and protection of public utility infrastructures	Recreational/tourist activities and recreational boating	Disruption of access to Champlain Bridge Park for recreational activities (fishing, windsurfing, cycling, hunting, etc.).	Average	Temporary	Local	Medium	S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
23.	Pre-construction	Relocation and protection of public utility infrastructures	Infrastructure	Relocation of the power line will require temporary closures or traffic lane diversions (Route 132 and ramps).	Low	Temporary	Regional	Medium	CCDG 10.3.1 and 10.3.4.3 S-16 The public will be informed of the work and the detours provided. Alternate routes will be proposed.	Non-significant
24.	Pre-construction	Relocation and protection of public utility infrastructures	Wetlands	Potential destruction of part of wetland due to installation of a tower for the high voltage line in Brossard (between 100 m^2 and 250 m^2 of common water reed marsh).	High	Permanent	Limited	Major	CC-1 Design engineering structures to comply with the Federal Policy on Wetland Conservation by favouring, in order of importance, impact avoidance, impact minimization and loss compensation. If necessary, prepare a compensation plan including the creation, development or conservation of a wetland of equivalent ecological function. When work is performed in wetlands, implement the following measures: - MPO-3, MPO-4, MPO-11 and MPO-16 - CCDG 10.4.3.2.1, 10.4.3.2.2 and 10.4.3.2.3	Non-significant
25.	Pre-construction	Relocation and protection of public utility infrastructures	Groundwater quality	Excavation of contaminated soil or sediment beneath the water table may result in groundwater contamination.	Average	Temporary	Limited	Medium	S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal.	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
26.	Pre-construction	Relocation and protection of public utility infrastructures	Soil and sediment quality	Excavating and piling contaminated soil could cause contamination of soils and sediment under or near excavation zones and piles.	Average	Permanent	Limited	Medium	NC 9.3.3.4	Non-significant
27.	Construction	Soil stripping and land clearing	Recreational/tourist activities and recreational boating	Bike path corridors and some riverfront areas used for recreational / tourist activities (wading, windsurfing, hunting, etc.) used for some construction activities.	Low	Temporary	Local	Minor	S-1 As far as possible, keep a cycling link open during the official opening period between the South Shore and Montreal. S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
28.	Construction	Soil stripping and land clearing	Avifauna and habitats	Disturbance of potential avifauna habitat and possible accidental destruction of nests, eggs or birds.	High	Temporary	Local	Major	CCDG 11.2.7.1 S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August. S-21 Work on and in the vicinity of the Couvée Islands migratory bird sanctuary must be performed in accordance with EC requirements.	Non-significant
29.	Construction	Soil stripping and land clearing	Special status wildlife and plant species	Potential mortality of individuals and potential loss of habitat for rough water-horehound on the South Shore and for the brown snake on Montreal Island, Nuns' Island and the Seaway dike.	High	Permanent	Limited	Major	S-5 In the spring, install a fence along the construction perimeter (exclosure) and maintain it for the duration of the work. S-6 At the end of summer and before start of work, capture brown snakes found on the exclosure and relocate them in suitable habitats outside the site. Relocation should be discussed with the appropriate authorities (MDDEFP). S-22 Signpost areas where special status plant species are present and prohibit access during construction work. S-23 Prior to the start of work, transplant species that could be affected by the work to an area that will remain undisturbed.	Non-significant
30.	Construction	Soil stripping and land clearing	Herpetofauna and habitats	Potential mortality of individuals and disturbance of herpetofauna habitat during construction of temporary facilities in the Nuns' Island and seaway dike bridge sectors.	Average	Permanent	Limited	Medium	NC 9.5.3 S-5 In the spring, install a fence along the construction perimeter (exclosure) and maintain it for the duration of the work. S-7 As far as possible, avoid work in wetlands suitable for herpetofauna (Nuns' Island Bridge and Seaway Dike) or minimize work in these environments.	Non-significant
31.	Construction	Soil stripping and land clearing	Ichthyofauna and habitats	Sediment runoff from work on the riverbank could disturb fish habitats downstream from the work especially in lentic flow zones (Types 2 and 4 in figure 73 in Part I of the Environmental Assessment Report).	High	Temporary	Local	Major	MPO-4, MPO-7 and MPO-8 NC 9.4.2	Non-significant

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32.	Construction	Soil stripping and land clearing	Ichthyofauna and habitats	Leaching of contaminants from contaminated riverbank sites could affect fish health.	High	Temporary	Regional	Major	MPO-8 NC 9.4.2 S-24 Initiate contaminant monitoring in aquatic environments during construction work (see section 9.8.2 for details).	Non-significant
33.	Construction	Soil stripping and land clearing	Mammals	Temporary habitat loss.	Low	Temporary	Limited	Minor	No action at this stage.	Non-significant
34.	Construction	Soil stripping and land clearing	Wetlands	Loss of wetlands due to land clearing and soil stripping in the new corridor in the following proportions: 4,300 m^2 of a common water reed marsh.	High	Permanent	Limited	Major	CC-1 Design engineering structures to comply with the Federal Policy on Wetland Conservation by favouring, in order of importance, impact avoidance, impact minimization and loss compensation. If necessary, prepare a compensation plan including the creation or conservation of a wetland of equivalent ecological function. When work is performed in wetlands, implement the following measures: - MPO-3, MPO-4, MPO-11 and MPO-16 - CCDG 10.4.3.2.1, 10.4.3.2.2 and 10.4.3.2.3	Non-significant
35.	Construction	Soil stripping and land clearing	Heritage and archeology	Soil stripping could disturb archeological remains, particularly at the Le-Ber site (BiFj-1).	High	Permanent	Local	Major	S-25 Conduct archeological surveys in the sectors affected by the work (see Appendix 3). S-26 Any discovery of archeological remains must immediately be communicated to MCCQ. Work at the discovery site should stop until a Ministry archeologist has completed a qualitative and quantitative assessment.	Non-significant
36.	Construction	Soil stripping and land clearing	Surface water quality	Potential contamination of surface water due to soil runoff from the disturbed areas. Potential increase in SS concentrations in surface water. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species. Note: The *Migratory Birds Regulations* (MBR) prohibits the introduction of toxic substances into migratory bird habitats.	Average	Temporary	Local	Medium	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-8, MPO-11, MPO-13 CCDG 10.4.3.1, 10.4.3.2.1, 10.4.3.2.2 and 10.4.3.2.3 NC 9.4.2 and 9.4.3.1 S-24 Initiate contaminant monitoring in aquatic environments during construction work (see section 9.8.2 for details).	Non-significant
37.	Construction	Soil stripping and land clearing	Soil and sediment quality	Land clearing and soil stripping will leave soil exposed and cause increased erosion.	Average	Permanent	Limited	Medium	MPO-6, MPO-8 CCDG 10.4.3.2.2 and 10.4.3.5 NC 9.4.3.1, 9.4.3.2 and 9.4.3.3 S-13 Isolate and preserve the organic soil layer so that it may be reused in places where the topsoil has been stripped.	Non Important
38.	Construction	Soil stripping and land clearing	Soil and sediment quality	Piling contaminated soil could cause soil and sediment contamination under or near the piles.	Average	Permanent	Limited	Medium	NC 9.3.3.4	Non-significant

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39.	Construction	Soil stripping and land clearing	Terrestrial vegetation	Loss of terrestrial and riparian vegetation due to land clearing and soil stripping in the new corridor.	Average	Permanent	Limited	Medium	CCDG 11.2.5, 11.2.6 and 11.2.7.1 NC 9.4.2	Non-significant
40.	Construction	Excavation, earthworks	Ichthyofauna and habitats	Sediment runoff from work on the riverbank could disturb fish habitats downstream from the work especially in lentic flow zones (Types 2 and 4 in figure 73).	High	Temporary	Local	Major	MPO-4 to MPO-8, CCDG 10.4.3.1, 10.4.3.2.1, 10.4.3.2.2 and 10.4.3.2.3 NC 9.4.3.1	Non-significant
41.	Construction	Excavation, earthworks	Ichthyofauna and habitats	Excavation of contaminated backfill could cause contaminants to leach from and/or wash off contaminated riverbank sites. These could affect fish health.	High	Temporary	Regional	Major	CC-2 The design of the engineering structures must minimize encroachment by the north abutment of the Nuns' Island Bridge, keeping it as far as possible from the bank and no closer than the 15 m riparian strip. MPO-4 to MPO-8 NC 9.4.3 S-24 Initiate contaminant monitoring in aquatic environments during construction work (see section 9.8.2 for details).	Non-significant
42.	Construction	Excavation, earthworks	Infrastructure	The work may damage infrastructure, the road network in particular, used by the local and regional population.	Low	Temporary	Limited	Minor	CCDG 7.11 S-27 Favour the corridor footprint as the principal access to the construction zones and limit, as far as possible, the movement of machinery to the work areas located within this corridor. S-28 The private partner must ensure that underground infrastructure is clearly identified in the plans and protected at the site.	Non-significant
43.	Construction	Excavation, earthworks	Wetlands	Excavation and earthworks will change the drainage pattern near wetlands and may result in a reduction of quality and possible losses.	Average	Permanent	Limited	Medium	MPO-8 CCDG 10.4.3.2.1, 10.4.3.2.2 and 10.4.3.2.3 Note: A compensation plan will be needed if the ecological functions of affected environments are modified.	Non-significant
44.	Construction	Excavation, earthworks	Commercial ship traffic	Possible loss of water-tightness in the seaway dike or in the pipe located beneath the dike.	High	Temporary	Regional	Major	S-18 Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner.	Non-significant
45.	Construction	Excavation, earthworks	Heritage and archeology	Excavation work may disturb archeological remains, particularly at the Le-Ber site (BiFj-1).	High	Permanent	Local	Major	In areas identified as being of potential archeological and historical interest: S-29 In the sensitive area of the Le Ber site, if soil is excavated to construct the infrastructure base, backfill should be mechanically stripped down to the level of the ancient soil, and then a checkerboard dig of the areas affected should be conducted. Ancient soils are found at a depth of approximately 1 m in this sector. Exploratory stripping should be carried out under archeological supervision. If soil is not excavated for the construction of the new infrastructure, a protective layer could be spread over the existing soil to seal the site. S-30 An archeological inventory survey will have to be conducted in the S-1 area of archeological potential. Should archeological remains be discovered, a site assessment will be made and a recommendation will be issued on the measures to be taken to either protect the site or conduct a dig. S-31 It is recommended that an archeologist be present at the site during excavation work in areas of archeological potential (see Appendix 3).	Non-significant

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46.	Construction	Excavation, earthworks	Air quality	During excavation work, exposed surfaces and piles of granular material could lead to airborne dust and affect air quality particularly in dry weather.	Low	Temporary	Limited	Minor	MPO-11 NC 9.4.3.1, 9.4.3.2 and 9.4.3.3 S-32 Excavated materials must be kept wet or covered with geotextile.	Non-significant
47.	Construction	Excavation, earthworks	Surface water quality	Water pumped from excavations could contaminate watercourses.	Low	Short-lived	Limited	Minor	PC-4 Pumped water must meet the criteria for discharge in natural environments for all contaminants. Monitoring must be increased in contaminated sectors (Island of Montreal). If these criteria are exceeded, pumped water must be treated and disposed of in an authorized location. MPO-16	Non-significant
48.	Construction	Excavation, earthworks	Surface water quality	Excavation work and earthworks will change the drainage pattern and may result in increased runoff and transfer of SS to watercourses. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species. Note: The *Migratory Birds Regulations* (MBR) prohibits the introduction of toxic substances into migratory bird habitats.	Low	Temporary	Limited	Minor	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 CCDG 10.4.3.2.1, 10.4.3.2.2 and 10.4.3.2.3 NC 9.4.3	Non-significant
49.	Construction	Excavation, earthworks	Groundwater quality	Excavation of contaminated soil or sediment beneath the water table may result in groundwater contamination.	Average	Temporary	Limited	Medium	S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal. S-33 During excavation work, special attention must be paid to the presence of waste in the northern section of the Nuns' Island Bridge (Montreal) and, if necessary, such waste must be removed for disposal (e.g., empty barrels) to prevent it becoming a source of contamination. S-34 Groundwater must be monitored for signs of work-related contamination. Periodic sampling will be conducted both upstream and downstream from construction zones on the Island of Montreal.	Non-significant
50.	Construction	Excavation, earthworks	Soil and sediment quality	Excavation work could leave waste exposed, particularly for the north abutment of Nuns' Island Bridge and Highway 15.	Average	Temporary	Limited	Medium	S-33 During excavation work, special attention must be paid to the presence of waste in the northern section of the Nuns' Island Bridge (Montreal) and, if necessary, such waste must be removed for disposal (e.g., empty barrels) to prevent it becoming a source of contamination.	Non-significant
51.	Construction	Excavation, earthworks	Soil and sediment quality	Excavating and piling contaminated soil could cause contamination of soils and sediment under or near excavation zones and piles.	Average	Permanent	Limited	Medium	CC-3 The project's preliminary design must identify excavation locations so that these areas can be characterized and an environmental management plan for excavated materials can be developed. NC 9.3.3.4 S-35 Establish a contaminated soil management plan and ensure that contaminated soil is treated or disposed of in accordance with prevailing regulations. S-36 Contaminated soil must be piled on a waterproof surface and should be no higher than 2.5 m. The volume of each pile must not exceed100 m^3 and piles must be covered with a waterproof membrane.	Non-significant

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52.	Construction	Excavation, earthworks	Air quality	Embankments on the Montreal shore may contain methane in concentrations that could be dangerous or explosive.	Average	Temporary	Limited	Medium	S-37 The potential presence of methane in the soil must be taken into consideration in the design of the future project structures (temporary and permanent). Situations likely to cause gas to accumulate in an area (including underneath ground-level infrastructure) or in an enclosed space where there is also an ignition source or in a space or premises even occasionally occupied by a worker or any other person must be avoided.	Non-significant
53.	Construction	Excavation, earthworks	Land and buildings	Possibility of damage to land neighbouring the construction footprint.	Low	Temporary	Limited	Minor	CCDG 7.11 S-38 Conduct an inspection before the start of construction of critical work likely to cause damage and adjust the working method accordingly.	Non-significant
54.	Construction	Construction of infrastructure	Recreational/tourist activities and recreational boating	Installation of decks and construction of bridge abutments could lead to partial or complete closure of bike paths under the new bridges and of accesses to some riverfront areas used for recreational / tourist activities (wading, windsurfing, hunting, etc.).	High	Temporary	Local	Major	S-1 As far as possible, keep a cycling link open during the official opening period between the South Shore and Montreal. S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
55.	Construction	Construction of infrastructure	Special status wildlife and plant species	Peregrine falcon nesting on the Champlain Bridge could be disrupted during construction work.	High	Temporary	Local	Major	S-39 Manage, relocate and if necessary add falcon nesting boxes depending on the sectors of activity. Retain the services of an expert on birds of prey to advise the private partner and encourage coexistence between workers and this species whenever possible.	Non-significant
56.	Construction	Construction of infrastructure	Recreational/tourist activities and recreational boating	Access to riverfront areas near the new bridge will be restricted, which will limit recreational / tourist activities when bridge structures are assembled.	Low	Temporary	Limited	Minor	S-1 As far as possible, keep a cycling link open during the official opening period between the South Shore and Montreal. S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
57.	Construction	Construction of infrastructure	Infrastructures	Soil compaction work producing vibrations could damage infrastructure (buildings and pipes).	Average	Temporary	Local	Medium	CCDG 11.4.4	Non-significant
58.	Construction	Construction of infrastructure	Commercial ship traffic	Installation of the bridge deck above the seaway could affect commercial navigation.	High	Temporary	Regional	Major	S-18 Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner.	Non-significant
59.	Construction	Construction of infrastructure	Heritage and archeology	Construction of the abutment on Nuns' Island and redevelopment of René-Lévesque Boulevard could encroach on the Le Ber archeological site (BiFj-1). Construction is not expected to have any impact on site BiFj-49 (prehistoric burial ground) as the project does not affect this sector.	High	Permanent	Local	Major	CC-4 Bridge design (components D1a and C) must minimize encroachment of permanent (abutment and boulevard) and temporary (detours) structures on the Le Ber archeological site (BiFj-1). S-26 Any discovery of archeological remains must immediately be communicated to MCCQ. Work at the discovery site should stop until an archeologist from the Ministry has completed a qualitative and quantitative assessment. S-40 Archeological remains found on the site during construction must be sent to MCCQ. S-41 If work is required to temporarily divert the boulevard; a protective layer could be spread over the existing soil to seal the site.	Non-significant

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60.	Construction	Work in aquatic environments	Avifauna and habitats	Work in water could disturb waterfowl which frequent the study area, particularly in the migratory bird sanctuary on Couvée Islands.	Average	Temporary	Local	Medium	S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area. S-21 Work on and in the vicinity of the Couvée Islands migratory bird sanctuary must be performed in accordance with EC requirements.	Non-significant
61.	Construction	Work in aquatic environments	Special status wildlife and plant species	Installation of temporary structures, such as cofferdams and jetties, for the construction of piers could affect potential habitats of special status fish (see Table 72 for details) and aquatic plant communities used as habitats, feeding grounds and shelter for certain special status migratory birds.	Average	Temporary	Local	Medium	CC-5 Pier design should avoid, where possible, type 22 zones near the shores of Nuns' Island. MPO-1 to MPO-5, MPO-10, and MPO-14 to MPO-21 S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area.	Non-significant
62.	Construction	Work in aquatic environments	Special status wildlife and plant species	Construction of piers could affect the habitat of the laurentian water-horehound on the Nuns' Island side.	High	Permanent	Limited	Major	S-22 Signpost areas where special status plant species are present and prohibit access during construction work. S-23 Prior to the start of work, transplant species that could be affected by the work to an area that will remain undisturbed.	Non-significant
63.	Construction	Work in aquatic environments	Hydrology and hydraulics	Construction of piers will change hydraulic conditions, mainly in the Greater La Prairie Basin.	Low	Permanent	Local	Medium	CC-6 Following or during the structural design stage (but before start of construction work), conduct flow and ice regime modeling in order to predict potential effects. Additional measures may be required. Changes to flow conditions should not significantly affect flow patterns and velocities in the principal fish migration routes (Greater La Prairie Basin and the Nuns' Island channel).	Non-significant
64.	Construction	Work in aquatic environments	Ichthyofauna and habitats	Sediment resuspension could disturb fish habitats downstream from the work, particularly in the Lesser La Prairie Basin and Nuns' Island channel.	High	Temporary	Regional	Major	MPO-1 to MPO-5, MPO-10 and MPO-16	Non-significant
65.	Construction	Work in aquatic environments	Ichthyofauna and habitats	The construction of the piers and wharf will alter the fish habitat by changing flow velocities.	Average	Temporary	Local	Medium	CC-6 Following or during the structural design stage (but before start of construction work), conduct flow and ice regime modeling in order to predict potential effects. Additional measures may be required. Changes to flow conditions should not significantly affect flow patterns and velocities in the principal fish migration routes (Greater La Prairie Basin and the Nuns' Island channel). MPO-1 to MPO-3 and MPO-10	Non-significant
66.	Construction	Work in aquatic environments	Ichthyofauna and habitats	Work in water could disturb the tranquility of the fish habitat during spawning and migration periods.	Average	Temporary	Regional	Major	MPO-1 to MPO-3 and MPO-10	Non-significant
67.	Construction	Work in aquatic environments	Ichthyofauna and habitats	Work causing vibrations in water could disturb fish and possibly result in deaths due to blasting.	Average	Temporary	Local	Medium	MPO-1 to MPO-3 S-42 Comply with DFO standards (1998) for the use of explosives near or in aquatic environments. S-43 If it is not possible to comply with DFO requirements regarding explosives, authorization to destroy fish by means other than fishing must be obtained from DFO. (At present, no information is available on the explosives and charges required).	Non-significant

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68.	Construction	Work in aquatic environments	Ichthyofauna and habitats	Construction of piers and a possible wharf could lead to a temporary deterioration or disturbance of fish habitat (estimate based on the scenario with the greatest encroachment: 12,050 m^2 and 34,200m^2).	Average	Temporary	Local	Medium	MPO-1 to MPO-3, MPO-10 and MPO-13	Non-significant
69.	Construction	Work in aquatic environments	Commercial ship traffic	Construction of footings, foundations and piers on the seaway dike could affect commercial shipping.	High	Temporary	Regional	Major	S-18 Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner. S-44 Negotiate and sign a lease with SLSMC to occupy the space required for the work.	Non-significant
70.	Construction	Work in aquatic environments	Surface water quality	Potential increase in SS concentrations in surface water caused by sediment disturbance in the La Prairie basins. Potential increase concentrations of organic and inorganic contaminants in surface water caused by sediment disturbance in the Lesser and Greater La Prairie Basins. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Temporary	Local	Medium	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-8 S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal.	Non-significant
71.	Construction	Work in aquatic environments	Surface water quality	Work on Highway 15 could degrade water quality in the Aqueduct Canal.	High	Temporary	Regional	Major	S-45 Isolate water affected by work in the littoral sector of the Aqueduct Canal from raw water needed to supply the filtration plant by a method that minimizes sediment suspension from the canal bed. S-46 The private partner must ensure that no contamination reaches the property of the Aqueduct Canal whether via storm sewers, contaminated soil, leachate from contaminated soil or any other form of contamination. S-47 If work is required near the Aqueduct Canal; this work must be performed within a contained enclosure in order to prevent suspended solids from spreading into the air and water. S-48 Access to the banks of the Aqueduct Canal will be prohibited. S-49 If barges are used on the Aqueduct Canal, the following measures are required: - No combustion engine may be used in the waters of the canal - Launching ramps are prohibited. Barges must be raised by crane. S-50 All work on or near the Aqueduct Canal must be approved by the City of Montreal. Additional measures may be identified at a later date. S-51 Debris is to be recovered by means of a tarpaulin stretched under the work area and removed as soon as possible.	
72.	Construction	Work in aquatic environments	Surface water quality	Residue and waste could be discarded in surface water and affect water quality.	Average	Short	Local	Minor	MPO-5, MPO-25 S-51 Debris is to be recovered by means of a tarpaulin stretched under the work area and removed as soon as possible.	Non-significant

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NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
73.	Construction	Work in aquatic environments	Soil and sediment quality	Work in water for pier construction for the seaway crossing (D2) and the new Nuns' Island bridge (B) could lead to remobilization of contaminated sediments.	High	Temporary	Local	Major	MPO-3, MPO-10 and MPO-11 S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal. S-53 Establish a working method that limits resuspension of contaminated sediment (e.g., excavation performed within a coffer-dam or protective curtain). S-54 Immediately remove to an approved site excavated sediment with a contaminant concentration in excess of established criteria. S-55 Excavated sediment that cannot be removed must be immediately placed for temporary storage on a waterproof surface and covered for protection from the elements (e.g., sediment from uncharacterized piers). S-56 Temporary structures in watercourses must be stabilized for protection against erosion with, for example, a geotextile membrane or riprap. Furthermore, these structures must be designed to withstand flooding (and ice loading) which may occur during construction.	Non-significant
74.	Construction	Work in aquatic environments	Aquatic vegetation	Pier construction could destroy aquatic vegetation, including aquatic plant communities serving as fish and bird habitats.	Average	Permanent	Limited	Medium	MPO-1 S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area.	Non-significant
75.	Construction	Management of waste and hazardous materials	Air quality	Poor management of volatile waste could lead to the release of contaminants into the atmosphere.	Average	Temporary	Limited	Minor	S-57 Fires and waste burning on or near the construction site is prohibited at all times. CCDG 11.4.7.2.1 and 11.4.7.3.1	Non-significant
76.	Construction	Management of waste and hazardous materials	Surface water quality	Accidental release of oil, other hazardous materials or waste into the St. Lawrence River could affect surface water quality. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Short	Limited	Minor	CCDG 7.11 and 10.4.3.1 S-9 Maintain transportation vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous emissions and noise. S-58 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants.	Non-significant
77.	Construction	Management of waste and hazardous materials	Groundwater quality	Temporary storage and disposal at unauthorized sites could adversely affect groundwater quality.	Average	Temporary	Limited	Medium	CCDG 7.11, 10.4.3.2.2 and 11.4.7.2.1 NC 9.3.3.1 to 9.3.3.4 S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants. S-60 The operations site must be free of waste at all times including empty containers of any kind unless they are stored in a sealed repository designed for this purpose.	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
78.	Construction	Management of waste and hazardous materials	Soil and sediment quality	Temporary storage and disposal at unauthorized sites could adversely affect soil quality in that location.	Average	Permanent	Limited	Medium	CCDG 7.11 and 11.4.7.2.1 NC 9.3.3.1 to 9.3.3.4 S-60 The operations site must be free of waste at all times including empty containers of any kind unless they are stored in a sealed repository designed for this purpose. S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants.	Non-significant
79.	Construction	Transportation, operation and maintenance of machinery	Sound environment	Movement of vehicles and machinery will increase noise levels near the worksite.	High	Temporary	Limited	Major	PC-1 Noise levels associated with site mobilization activities must not exceed the following thresholds: $L_{10\%}$ = 75 dbA during daytime; ambient noise +5 dbA during evening and night (measured at 5 m from sensitive areas). Where these thresholds cannot be met, mitigation measures must be implemented, such as: - NC 9.9.3.1 - NC 9.9.3.2 - NC 9.9.3.3. S-4 Where feasible, permanent noise barriers will be built before the start of work.	Non-significant
80.	Construction	Transportation, operation and maintenance of machinery	Ichthyofauna and habitats	Accidental spills of oil or other products could harm fish and fish habitats.	Average	Short	Local	Medium	CCDG 10.4.2 NC 9.3.2 S-61 In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams; - Notification of municipalities downstream with water intakes that could be affected by the spill; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent berms); - Clean up of the affected area. S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log.	Non-significant
81.	Construction	Transportation, operation and maintenance of machinery	Infrastructure	Traffic associated with work on Nuns' Island will increase traffic congestion on the local network.	Average	Temporary	Local	Medium	S-62 The private partner must establish an alternate transportation system and organize parking near the worksite restricting access to the local network.	Non-significant
82.	Construction	Transportation, operation and maintenance of machinery	Infrastructure	Transportation could damage and dirty surrounding roads during construction.	Low	Temporary	Limited	Minor	S-27 Favour the corridor footprint as the principal access to the construction zones and limit, as far as possible, the movement of machinery to the work areas located within this corridor. S-8 When working in urban areas, remove loose material and other debris on a daily basis from streets used by vehicles and machinery. CCDG 7.11	Non-significant

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NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
83.	Construction	Transportation, operation and maintenance of machinery	Air quality	Movement of vehicles and machinery on temporary roads could generate dust on and near the worksite.	Average	Temporary	Local	Medium	CCDG 12.4 S-63 Use adequate signage and impose appropriate maximum speeds to reduce dust emissions on access roads and work surfaces. S-8 When working in urban areas, remove loose material and other debris from streets used by vehicles and machinery. S-64 Place tarpaulins on trucks. S-65 Favour a route for transporting materials that avoids residential neighbourhoods.	Non-significant
84.	Construction	Transportation, operation and maintenance of machinery	Air quality	Movement of vehicles and machinery on temporary roads will produce particulate emissions and atmospheric contaminants.	Average	Temporary	Local	Medium	S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-64 Place tarpaulins on trucks. S-65 Favour a route for transporting materials that avoids residential neighbourhoods S-66 GHG emissions during the work will be offset to make the worksite "carbon neutral". During the construction phase, annual emissions will be calculated based on the number of kilometres travelled by the machinery and transportation of materials and excavations. Compensation may take the form of buying carbon credits or of carrying out independent projects. S-11 Ensure that catalytic converters on all vehicles are in proper working order throughout the construction period.	Non-significant
85.	Construction	Transportation, operation and maintenance of machinery	Surface water quality	Leaks from machinery used near or on water could contaminate surface water. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Temporary	Local	Medium	CCDG 10.4.2 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-61 In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams; - Notification of municipalities downstream with water intakes that could be affected by the spill; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent berms); - Clean up of the affected area. S-67 Before the start of work, develop and implement spill response procedures. S-68 Use vegetable oil in machinery that will be used for long periods on or near water.	Non-significant

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NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
86.	Construction	Transportation, operation and maintenance of machinery	Groundwater quality	During transportation of construction materials, accidental oil or fuel spills may affect groundwater quality.	Average	Temporary	Limited	Medium	CCDG 10.4.2 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-61 In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams; - Notification of municipalities downstream with water intakes that could be affected by the spill; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent berms); - Clean up of the affected area. S-67 Before the start of work, develop and implement spill response procedures.	Non-significant
87.	Construction	Transportation, operation and maintenance of machinery	Soil and sediment quality	Truck traffic from contaminated areas could lead to contamination of soil adjacent to the worksite. Accidental spills could occur during on-site machinery maintenance.	Average	Permanent	Local	Major	NC 9.3.2 S-69 When contamination levels exceed criterion B of the *Quebec Soil Protection and Contaminated Sites Rehabilitation Policy*, all trucks leaving the worksite must pass through a vehicle wheel-washing facility. These areas will be determined at a later stage (Environmental Site Assessment phases II and III).	Non-significant
88.	Construction	Transportation, operation and maintenance of machinery	Soil and sediment quality	During transportation (by land or water) of construction material, accidental oil or fuel spills could affect soil quality at the worksite and sediment in the river.	Low	Permanent	Limited	Medium	CCDG 10.4.2 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-67 Before the start of work, develop and implement spill response procedures.	Non-significant
89.	Post-construction	Demobilization of worksite and dismantling of temporary facilities	Surface water quality	Site remediation could result in resuspension of sediment and affect water quality. The areas most at risk are located along the St. Lawrence River. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Low	Temporary	Local	Minor	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-9 to MPO-13 CCDG 10.4.3.3, 10.4.3.2.1, and 10.4.3.2.2 NC 9.4.3.3	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
90.	Post-construction	Demobilization of worksite and dismantling of temporary facilities	Groundwater quality	Soil from contaminated sites could affect groundwater quality.	Low	Temporary	Limited	Medium	CCDG 7.11 NC 9.3.3.4 S-70 In the event of a spill on land, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response team; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent material); - Clean up of the affected area. - Disposal of contaminated soil.	Non-significant
91.	Post-construction	Demobilization of worksite and dismantling of temporary facilities	Soil and sediment quality	Contaminants on the site could degrade soil quality.	Low	Permanent	Limited	Medium	CCDG 7.11 S-70 In the event of a spill on land, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response team; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent material); - Clean up of the affected area. - Disposal of contaminated soil.	Non-significant
92.	Post-construction	Deconstruction of existing bridges	Recreational/tourist activities and recreational boating	Bike path corridors and some riverfront areas used for recreational / tourist activities (wading, windsurfing, hunting, etc.) used for some deconstruction activities.	High	Temporary	Local	Major	S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
93.	Post-construction	Deconstruction of existing bridges	Aesthetic and visual aspects	The view towards Champlain Bridge and its structure will change.	Average	Permanent	Regional	Major	The view of the New Bridge for the St. Lawrence will remain substantially unchanged.	Non-significant
94.	Post-construction	Deconstruction of existing bridges	Avifauna and habitats	Bird habitats, especially cliff swallow habitats, on the bridge structure will be disrupted and destroyed during deconstruction work.	High	Permanent	Limited	Major	S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area.	Non-significant
95.	Post-construction	Deconstruction of existing bridges	Special status wildlife and plant species	Deconstruction of Champlain Bridge will affect peregrine falcon nesting boxes and could affect the rough water-horehound habitat on the banks of the South Shore and the brown snake habitat on Montreal Island, Nuns' Island and the seaway dike.	High	Permanent	Limited	Major	S-6 At the end of summer and before the start of work, capture brown snakes on the exclosure and relocate them in suitable habitats outside the site. Relocation should be discussed with the appropriate authorities (MDDEFP). S-23 Prior to the start of work, transplant species that could be affected by the work to an area that will remain undisturbed (rough water-horehound). S-71 Check for peregrine falcon nesting on the bridge before the start of work. If there are nesting birds, organize a 250-metre exclusion zone centred on the nest until the end of the nesting period, or approx. 75 days after egg-laying. S-72 Work with Environment Canada's Peregrine Falcon Recovery Team on an appropriate way to install nesting boxes. Peregrine falcon nesting boxes must be moved to or installed on the new bridge or a suitable site in the vicinity.	Non-significant

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96.	Post-construction	Deconstruction of existing bridges	Herpetofauna and habitats	Herpetofauna habitats beneath the bridges will be disturbed and destroyed during deconstruction work.	Average	Permanent	Limited	Medium	CCDG 7.11 S-7 As far as possible, avoid work in wetlands suitable for herpetofauna (Nuns' Island Bridge and Seaway Dike) or minimize work in these environments.	Non-significant
97.	Post-construction	Deconstruction of existing bridges	Ichthyofauna and habitats	Deconstruction of the Champlain and Nuns' Island bridges may generate waste that could affect the fish habitat.	Average	Permanent	Local	Major	MPO 1, MPO-25	Non-significant
98.	Post-construction	Deconstruction of existing bridges	Infrastructure	The deconstruction of the bridges will require temporary lane closures or detours (René-Lévesque Boul., Route 132 and ramps).	Low	Temporary	Regional	Medium	CCDG 10.3.1 and 10.3.4.3 S-16 The public will be informed of the work and the detours provided. Alternate routes will be proposed. S-17 At least one, preferably two, accesses to Nuns' Island local network will be maintained at all times on the local road and highway network.	Non-significant
99.	Post-construction	Deconstruction of existing bridges	Commercial ship traffic	Removal of the bridge deck over the seaway could affect commercial navigation at this location.	High	Temporary	Local	Major	S-18 Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner. S-73 Observe the current provisions of SLSMC's land use lease.	Non-significant
100.	Post-construction	Deconstruction of existing bridges	Air quality	Deconstruction work may produce a short-term degradation of air quality due to fugitive dust, some of which may contain contaminants.	Average	Temporary	Local	Medium	PC-2 Do not exceed a threshold of 30 µg/m^3 for fine airborne particulate matter less than 2.5 microns in diameter over a 24 hr. average (PM 2.5 24 hr. average) and an average concentration of total particulate matter over 24 hr. of 120 µg/m3 at 50 m from the footprint. Where these thresholds cannot be met, mitigation measures must be implemented, for example: - Use equipment fitted with dust collection systems, when available. - Install tarpaulins around work that generates dust. - Cover piled materials with geotextile - Encourage the use of wet-spray dust control equipment.	Non-significant
101.	Post-construction	Deconstruction of existing bridges	Surface water quality	Debris and cutting slurry from dismantling the deck may be end up in the river and affect surface water quality in this area. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Temporary	Local	Medium	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-5, MPO-14 to MPO-18, MPO-25	Non-significant
102.	Post-construction	Deconstruction of existing bridges	Surface water quality	The presence of lead in the structure could contaminate surface water.	Average	Temporary	Local	Medium	MPO-25	Non-significant
103.	Post-construction	Work in aquatic environments	Recreational/tourist activities and recreational boating	Remnants of the Champlain Bridge piers could pose a risk for recreational boating.	Average	Permanent	Limited	Medium	S-74 Keep boaters informed through notices to shipping, and once the work of removing existing bridge piers is completed carry out a bathymetric survey of these locations. S-75 Restore the bed of the watercourse to its original condition. In exceptional cases, piers must be reduced to at least 2 m below the low water level; reference zero on the nautical chart (ZC).	Non-significant

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104.	Post-construction	Work in aquatic environments	Recreational/tourist activities and recreational boating	Temporary disturbance of recreational boating lanes during work in water.	Average	Temporary	Local	Medium	S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
105.	Post-construction	Work in aquatic environments	Avifauna and habitats	Work in water could disturb waterfowl which frequent the study area, particularly in the migratory bird sanctuary on Couvée Islands.	Average	Temporary	Local	Medium	In the Couvée Islands sector: S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area. S-21 Work on and in the vicinity of the Couvée Islands migratory bird sanctuary must be performed in accordance with EC requirements.	Non-significant
106.	Post-construction	Work in aquatic environments	Special status wildlife and plant species	Installation of temporary structures, such as cofferdams and jetties, for the deconstruction of piers could affect potential habitats of special status fish (see Table 72 for details) and aquatic plant communities used as habitats, feeding grounds and shelter for certain special status migratory birds.	Average	Permanent	Limited	Medium	MPO-1 to MPO-5 and MPO-10 S-3 Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area.	Non-significant
107.	Post-construction	Work in aquatic environments	Ichthyofauna and habitats	Work causing vibrations in water could disturb fish and possibly result in deaths due to blasting.	Average	Temporary	Local	Medium	MPO-1 to MPO-5 and MPO-10 S-42 Comply with MPO standards (1998) for the use of explosives near or in aquatic environments. S-43 If it is not possible to comply with MPO requirements regarding explosives, authorization to destroy fish by means other than fishing must be obtained from the MPO.	Non-significant
108.	Post-construction	Work in aquatic environments	Ichthyofauna and habitats	Work in water could disturb fish, especially during spawning and migration periods.	Average	Temporary	Regional	Major	MPO-1, MPO-10 and MPO-25	Non-significant
109.	Post-construction	Work in aquatic environments	Surface water quality	Dismantling the existing bridge piers and removing temporary structures may cause sediment resuspension and the release of debris into the river affecting water quality.	Average	Temporary	Local	Medium	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-5, MPO-14 to MPO-18	Non-significant
110.	Post-construction	Work in aquatic environments	Surface water quality	Underwater cutting of existing bridge piers could produce cutting slurry that would end up in the river and affect water quality. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Short	Local	Medium	PC-3 The work must not produce concentrations of SS in the river in excess of 25 mg/l of existing concentrations. If these concentrations are exceeded, additional mitigation measures must be implemented, such as: - Install a turbidity curtain; - Adjust working methods; - Identify and control sources of SS emissions. MPO-4 to MPO-5, MPO-14 to MPO-18	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

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111.	Post-construction	Work in aquatic environments	Groundwater quality	If excavations must be performed to remove footings and foundations on floodplains and on the dike, excavation of contaminated soil or sediment below the water level could contaminate groundwater.	Average	Temporary	Limited	Medium	S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal.	Non-significant
112.	Post-construction	Work in aquatic environments	Soil and sediment quality	Work in water could involve excavation of contaminated sediment, which the private partner will need to manage.	Average	Short	Local	Medium	MPO-3, MPO-10 and MPO-11 S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal. S-53 Establish a working method that limits resuspension of contaminated sediment (e.g., excavation performed within a coffer-dam or protective curtain). S-54 Immediately remove to an approved site excavated sediment with a contaminant concentration in excess of established criteria. S-55 Excavated sediment that cannot be removed must be immediately placed for temporary storage on a waterproof surface and covered for protection from the elements (e.g., sediment from uncharacterized piers)). S-56 Temporary structures in watercourses must be stabilized for protection against erosion with, for example, a geotextile membrane or riprap. Furthermore, these structures must be designed to withstand flooding (and ice loading) which may occur during construction.	Non-significant
113.	Post-construction	Work in aquatic environments	Soil and sediment quality	Work in water, on the dike and in floodplains to dismantle footings and foundations could cause dispersion of contaminated sediment.	High	Temporary	Local	Major	S-20 When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal. S-76 Perform work in water in an enclosed, dry area.	Non-significant
114.	Post-construction	Work in aquatic environments	Aquatic vegetation	Aquatic vegetation attached to piers will be destroyed.	Average	Permanent	Limited	Medium	S-77 Ensure that there are no migratory bird nests or habitats of at-risk species in these locations. Should this be the case, act in compliance with prevailing laws and regulations. S-78 During restoration of abandoned sections, promote renaturalization with a suitable substrate to foster the growth of natural vegetation. Where natural recovery is not possible, native species will be planted or seeded.	Non-significant

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115.	Post-construction	Transportation, operation and maintenance of machinery	Recreational/tourist activities and recreational boating	River transportation of construction materials could affect the movement of recreational boats.	Average	Temporary	Local	Medium	S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services. S-96 Marine equipment used to carry out the work and the personnel working aboard such equipment must comply with the provisions of the *Canada Shipping Act, 2001* (2001, c. 26) and its Regulations. S-97 Contact CCG at 1-800-463-4393 or cell phone *16 to report any marine emergency.	Non-significant
116.	Post-construction	Transportation, operation and maintenance of machinery	Sound environment	The movement of vehicles and machinery will increase the noise level near the work.	Average	Temporary	Limited	Medium	PC-1 Noise levels associated with site mobilization activities must not exceed the following thresholds: $L_{10\%}$ = 75 dbA during daytime; ambient noise +5 dbA during evening and night (measured at 5 m from sensitive areas). Where these thresholds cannot be met, mitigation measures must be implemented, such as: - NC 9.9.3.1 - NC 9.9.3.2 - NC 9.9.3.3.	Non-significant
117.	Post-construction	Transportation, operation and maintenance of machinery	Air quality	Transporting debris by truck on the roads releases airborne contaminants.	Average	Temporary	Regional	Medium	S-64 Place tarpaulins on trucks. S-65 Favour a route for transporting materials that avoids residential neighbourhoods.	Non-significant
118.	Post-construction	Transportation, operation and maintenance of machinery	Air quality	Movement of vehicles and machinery on temporary roads will likely generate dust on and near the worksite.	Average	Temporary	Local	Medium	CCDG 12.4 S-8 During the entire duration of work in urban areas, remove loose material and other debris on a daily basis from streets used by vehicles and machinery. S-63 Use adequate signage and impose appropriate maximum speeds to reduce dust emissions on access roads and work surfaces.	Non-significant
119.	Post-construction	Transportation, operation and maintenance of machinery	Air quality	The movement of vehicles and machinery on temporary roads will generate particulate emissions and airborne contaminants.	Average	Temporary	Local	Medium	CCDG 12.4 S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-11 Ensure that catalytic converters on all vehicles are in proper working order throughout the construction period. S-12 Ensure that contractors and sub-contractors are made aware of environmental concerns including air quality.	Non-significant
120.	Post-construction	Management of waste and hazardous materials	Air quality	Debris containing asbestos and lead may be found during bridge and building (former toll booth) deconstruction.	Average	Temporary	Local	Medium	S-79 When developing deconstruction plans and specifications, materials characterizations must be conducted to identify and quantify those areas containing asbestos, lead or any other contaminant. Should these substances be detected, actions must be determined to deal with this situation.	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
121.	Post-construction	Transportation, operation and maintenance of machinery	Surface water quality	Using barges and other equipment on water could affect water quality. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Low	Permanent	Local	Medium	CCDG 7.11, 10.4.2 and 10.4.3.1 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-58 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-67 Before the start of work, develop and implement spill response procedures. S-68 Use vegetable oil in machinery that will be used for long periods on or near water.	Non-significant
122.	Post-construction	Transportation, operation and maintenance of machinery	Groundwater quality	During transportation of construction materials, accidental oil or fuel spills could affect groundwater quality.	Average	Temporary	Local	Medium	S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-58 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-49 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-53 Before the start of work, develop and implement spill response procedures. CCDG 7.11, 10.4.2 and 10.4.3.1	Non-significant
123.	Post-construction	Transportation, operation and maintenance of machinery	Soil and sediment quality	During transportation (by land or water) of construction material, accidental oil or fuel spills could affect soil quality at the worksite and sediment in the river.	Average	Temporary	Limited	Medium	CCDG 7.11, 10.4.2 and 10.4.3.1 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-44 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-67 Before the start of work, develop and implement spill response procedures. S-80 When critical work is being performed, personnel qualified to use the emergency kits will be permanently on site.	Non-significant

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NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
124.	Post-construction	Transportation, operation and maintenance of machinery	Surface water quality	Leaks from machinery and vehicles, especially equipment used for work in water, could contaminate surface water. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Average	Temporary	Limited	Medium	CCDG 7.11, 10.4.2 and 10.4.3.1 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-58 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-61 In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams; - Notification of municipalities downstream with water intakes that could be affected by the spill; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent berms); - Clean up of the affected area. S-67 Before the start of work, develop and implement spill response procedures.	Non-significant
125.	Post-construction	Management of waste and hazardous materials	Surface water quality	Accidental discharges of oil, other hazardous products or waste into watercourses could affect surface water quality. A change in water quality may degrade habitats of fish, migratory birds and fauna as well as special status species.	Low	Permanent	Limited	Medium	CCDG 7.11, 10.4.2 and 10.4.3.1 S-10 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-58 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants. S-67 Before the start of work, develop and implement spill response procedures. S-81 Asphalt debris must not be reused in aquatic environments.	Non-significant
126.	Post-construction	Management of waste and hazardous materials	Groundwater quality	Storage and disposal of concrete and steel debris in unauthorized locations would affect soil quality in that location.	Low	Permanent	Limited	Medium	CCDG 7.11 and 11.4.7.2.1 NC 9.3.3.1 to 9.3.3.4 S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants. S-60 The operations site must be free of waste at all times including empty containers of any kind unless they are stored in a sealed repository designed for this purpose.	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
127.	Post-construction	Management of waste and hazardous materials	Soil and sediment quality	Storage and disposal of concrete and steel debris in unauthorized locations would affect soil quality in that location.	Low	Permanent	Limited	Medium	CCDG 7.11 and 11.4.7.2.1 NC 9.3.3.1 to 9.3.3.4 S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants. S-60 The operations site must be free of waste at all times including empty containers of any kind unless they are stored in a sealed repository designed for this purpose. S-95 Bear in mind MDDEFP's guidelines for managing concrete, brick and asphalt from construction and demolition work and residue from the free stone sector.	Non-significant
128.	Post-construction	Management of waste and hazardous materials	Soil and sediment quality	Debris containing asbestos and lead may be found during deconstruction of engineering structures.	Average	Temporary	Limited	Minor	S-79 When developing deconstruction plans and specifications, materials characterizations must be conducted to identify and quantify those areas containing asbestos, lead or other contaminants. Should these substances be detected, actions must be determined to deal with this situation.	Non-significant
129.	Operations	Presence and use of infrastructure	Aesthetic and visual aspects	The situation of New Bridge for the St. Lawrence will change the landscape although the current and the planned locations are similar. Generally, and over the long term, the new bridge does not constitute a new intrusion on the existing landscape.	Average	Permanent	Regional	Major	CC-7 The New Bridge for the St. Lawrence should reflect the predominant role it plays in the Montreal landscape and enhance its value as a regional landmark with appropriate aesthetics. The views of the city and the river from the bridge will be unchanged. CC-8 The design should promote integration of the project into the urban environment so that existing strengths are maintained and weaknesses minimized during execution of this major infrastructure project. CC-9 Residual spaces will be given high-quality landscaping using native vegetation.	Non-significant
130.	Operations	Presence and use of infrastructure	Aesthetic and visual aspects	The new infrastructure will alter views from the bike path network.	Low	Permanent	Local	Medium	CC-10 The project should improve and consolidate the existing bike path network and enhance the views from the paths.	Non-significant
131.	Operations	Presence and use of infrastructure	Aesthetic and visual aspects	The unity of the city and adjacent neighbourhoods will be disrupted.	Average	Permanent	Local	Major	CC-11 Montreal's horizontal links could be enhanced by considering the quality and sizing of the engineering structures (viaducts) at the Atwater, Wellington and LaSalle intersections to improve connectivity between the Sud-Ouest and Verdun boroughs. CC-12 Consider the possibility of a horizontal link between the Sud-Ouest and Verdun boroughs. CC-13 Construction of the New Bridge for the St. Lawrence will not interfere with revitalization projects for the banks of the St. Lawrence. CC-14 Study the possibility of a pedestrian link on both sides Highway 10 on Nuns' Island.	Non-significant
132.	Operations	Presence and use of infrastructure	Avifauna and habitats	Migratory bird mortality during spring and autumn migrations particularly with a cable-stayed bridge.	Average	Permanent	Regional	Major	CC-15 Low intensity, short wavelength lights should be considered rather than red and yellow lights. Lighting should be directed toward the ground. CC-16 If obstruction lighting is required; the design should include a flashing system. S-82 The bridge operator should consider switching off architectural lighting (abutments, piers, cable-stays) during the spring and autumn migration periods, especially when visibility is poor, without compromising safety standards. Adjusting lighting of the cable-stays could reduce the number of birds colliding with the stays; to this end, flexibility should be incorporated into the design of the lighting system to better adapt it to environmental needs (aesthetic, light pollution, bird collisions, navigational aids and air traffic).	Non-significant

Table 70 (Cont'd) Analysis of environmental effects - New Bridge for the St. Lawrence

NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
133.	Operations	Presence and use of infrastructure	Avifauna and habitats	Loss of habitat (permanent).	Low	Permanent	Limited	Medium	CCDG 11.2.5, 11.2.6 and 11.2.7.1 NC 9.4.2	Non-significant
134.	Operations	Presence and use of infrastructure	Sound environment	Road traffic will affect noise levels in nearby sensitive areas. Locations of sensitive areas are presented in figure 84.	High	Permanent	Local	Major	CC-17 Infrastructure design will need to include anti-noise measures where the impact is major in noise-sensitive areas (see figure 84). The impact level is presented in Table 74. Sound mitigation measures should reduce the LAeq (24 hr.) residual noise level as close as possible to an acceptable noise level of 60 dBA. Noise barriers will have to be installed where possible within the TC right-of-way.	Non-significant
135.	Operations	Presence and use of infrastructure	Special status wildlife and plant species	Permanent loss of brown snake habitats.	High	Permanent	Limited	Major	S-83 Develop the area around the new infrastructure so as to create a suitable habitat for the brown snake. S-84 Consider installing permanent barriers to prevent roadkill of the brown snake in those areas where there is most risk.	Non-significant
136.	Operations	Presence and use of infrastructure	Herpetofauna and habitats	Permanent loss of habitats following construction of the project's engineering structures.	Low	Permanent	Limited	Medium	S-85 Develop the area around the new abutments so as to create a suitable habitat for herpetofauna.	Non-significant
137.	Operations	Presence and use of infrastructure	Ichthyofauna and habitats	Accidental oil spills or spills of other products can be harmful to fish and fish habitats.	Average	Short	Local	Medium	S-67 Before the start of work, develop and implement spill response procedures. CCDG 10.4.2	Non-significant
138.	Operations	Presence and use of infrastructure	Heritage and archeology	Potential loss of an archeologically important site.	High	Permanent	Local	Major	CC-18 The bridge design should enhance the historical character of the site when planning landscaping near the abutment.	Non-significant
139.	Operations	Presence and use of infrastructure	Air quality	Road traffic will affect air quality in the vicinity (GHG, atmospheric contaminants). Since atmospheric emissions are primarily a result of traffic speed and flow, better infrastructure design should improve traffic flow.	High	Permanent	Local	Major	CC-23 The design of the structures should consider integrating an intelligent traffic-control system linked to sensors that will analyze local air quality. S-86 Before the start of work, set up an air sampling station on Nuns' Island. Details on changes to GHGs are presented in section 8.1.	Non-significant
140.	Operations	Infrastructure maintenance and repair	Recreational/tourist activities and recreational boating	Structural maintenance could temporarily impede boating.	Average	Temporary	Local	Medium	S-2 When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.	Non-significant
141.	Operations	Infrastructure maintenance and repair	Ichthyofauna and habitats	De-icing salt and accidental spills of waste snow could affect the quality of the fish habitat. Given the river's average flow of 7,060 m3/s (see Part I, s. 4.1.8.1), chloride concentrations of 22 mg/L in the river (see Part I, Appendix 3C) and an application rate of 14.2 t/km/yr (MTQ, 2006) the contribution of chloride from the bridge represents less than 0.002% of the river's annual chloride load (85t/yr vs. 12,960 t/day). The CCME's recommendation for environmental quality / water quality / protection of aquatic life for chlorides will not be exceeded.	Average	Temporary	Local	Medium	S-87 Implement a management program for de-icing salt that minimizes use and maintains safe driving conditions. CC-19 The design must prevent meltwater from being discharged directly into sensitive areas (wetlands, MBS, fish habitats); an approach for treating meltwater will be studied. CC-20 The design must include collection and settling basins for runoff along the land sections of the route. CC-21 The structural geometry should limit accumulations of snow and ice on the infrastructures in order to reduce the need for de-icing.	Non-significant

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NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
142.	Operations	Infrastructure maintenance and repair	Infrastructures	Structural maintenance could temporarily impede traffic with detours and closures.	Low	Temporary	Local	Minor	S-88 The bridge operator will be responsible for informing the public of obstructions and alternate routes.	Non-significant
143.	Operations	Infrastructure maintenance and repair	Commercial ship traffic	Structural maintenance could temporarily impede commercial shipping.	Average	Temporary	Local	Medium	S-18 Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner. S-44 Negotiate and sign a lease with SLSMC to occupy the space required for the work. S-89 Observe the requirements of SLSMC's land use lease during maintenance and coordinate work with SLSMC.	Non-significant
144.	Operations	Infrastructure maintenance and repair	Air quality	Structural maintenance could produce dust and debris.	Average	Temporary	Local	Medium	S-90 Where available, use equipment fitted with a dust collection system during maintenance. S-91 Use tarpaulins during dust-producing work. S-92 Comply with dust emission standards of *Regulation 90 Respecting Air Quality* for work performed in Montreal, and the standards of the *Clean Air Regulation* of the Government of Quebec in Brossard.	Non-significant
145.	Operations	Infrastructure maintenance and repair	Surface water quality	Accidental discharges of oil or other products could affect surface water quality.	Average	Temporary	Local	Medium	CCDG 7.11, 10.4.2 and 10.4.3.1 S-9 Maintain vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous and noise emissions. S-10 Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log. S-58 Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.). S-59 Do not accumulate construction site waste within 30 m of a body of water or within 60 m if the waste contains or could contain contaminants. S-61 In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams; - Notification of municipalities downstream with water intakes that could be affected by the spill; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent berms); - Clean up of the affected area. S-67 Before the start of work, develop and implement spill response procedures.	Non-significant

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NO.	PROJECT PHASE	PROJECT COMPONENT	ENVIRONMENTAL COMPONENTS	DESCRIPTION OF ENVIRONMENTAL EFFECTS	INTENSITY	DURATION	SCOPE	ASSESSMENT OF POTENTIAL EFFECT	REQUIRED MITIGATION MEASURES	SIGNIFICANCE OF RESIDUAL EFFECTS
146.	Operations	Infrastructure maintenance and repair	Surface water quality	Structural maintenance over and underwater could release contaminants into surface water.	Average	Short	Local	Medium	MPO-4, MPO-5 and MPO-25	Non-significant
147.	Operations	Infrastructure maintenance and repair	Surface water quality	Dispersal of de-icing and snow-melting products on roads could affect water quality. Given the river's average flow of 7,060 m3/s (see Part I, s. 4.1.8.1), chloride concentrations of 22 mg/L in the river (see Part I, Appendix 3C) and an application rate of 14.2 t/km/yr (MTQ, 2006) the contribution of chloride from the bridge represents less than 0.002% of the river's annual chloride load (85t/yr vs. 12,960 t/day). The CCME's recommendation regarding environmental quality / water quality / protection of aquatic Life for chlorides will not be exceeded.	Low	Temporary	Local	Minor	S-87 Implement a management program for de-icing salt that minimizes use and maintains safe driving conditions. CC-19 The design must ensure that meltwater will not be discharged directly into sensitive areas (wetlands, MBS, fish habitats) and an approach for treating meltwater should be studied. CC-20 The design must include collection and settling basins for runoff along the land sections of the route. CC-21 The structural geometry should limit accumulations of snow and ice on the infrastructures in order to reduce the need for de-icing.	Non-significant
148.	Operations	Infrastructure maintenance and repair	Groundwater quality	De-icing and snow melting products could show up in groundwater.	Average	Permanent	Local	Major	S-87 Implement a management program for de-icing salt that minimizes use and maintains safe driving conditions. CC-19 The design must ensure that meltwater will not be discharged directly into sensitive areas (wetlands, MBS, fish habitats) and an approach for treating meltwater should be studied. CC-20 The design must include collection and settling basins for runoff along the land sections of the route. CC-21 The structural geometry should limit accumulations of snow and ice on the infrastructures in order to reduce the need for de-icing.	Non-significant
149.	Operations	Presence and use of infrastructure	Ichthyofauna and habitats	The presence of new piers will result in a potentially permanent loss of spawning and nursery habitat and feeding grounds.	Average	Permanent	Local	Major	MPO-10 and MPO-13 As a compensation measure, fish habitats could be created within the study area, for example, at the site of the old Champlain Bridge piers.	Non-significant
150.	Operations	Construction of infrastructures	Groundwater quality	Construction of infrastructure (abutments, foundations, footings) on the Montreal side, in the area of the Technoparc, could affect the installation and operation of a groundwater collection and treatment system.	Average	Temporary	Local	Medium	CC-22 Where necessary, the bridge design must take into account the geometry of the containment system in the western sector. S-93 Since work will be carried out in the same location; the private partner will need to plan construction on Montreal Island in collaboration with the operator of the Western sector containment system.	Non-significant
151.	Operations	Maintenance and repair of infrastructures	Soil and sediment quality	De-icing and snow-melting products are likely to be found in soil near the infrastructure.	Average	Permanent	Local	Major	S-94 Meltwater will not be directly discharged into sensitive areas such as wetlands.	Non-significant
152.	Decommissioning	Deconstruction of infrastructures	The effects and mitigation measures associated with decommissioning the structures at the end of their useful life in approximately 125 years are similar to those associated with the post-construction phase found in lines 88 to 127 of this Table.							Non-significant

7.3 ENVIRONMENTAL DESIGN CRITERIA

The inventory of the environment and the analysis of effects made it possible to identify certain constraints that need to be considered in the design of the structures for the New Bridge for the St. Lawrence. Incorporating environmental constraints from the outset of the design process will make it possible to select the optimal solution. The design must wherever possible ensure that when construction is over, the environment is returned to its initial state or to a better environmental state. Figure 84 shows the approximate locations of the areas in which environmental constraints must be considered at the design phase.

The principles of sustainable development will be incorporated at the various stages of project development. The principles of the Federal Sustainable Development Strategy (EC, 2010) must be considered at all design phases. The project must be in keeping with the regional development approach and assist in achieving the targets of Montreal's Transportation Plan (City of Montreal, 2007) and the Montreal Community Sustainable Development Plan 2010-2015 (City of Montreal, 2010). For example, with a view to sustainable development, existing civil engineering structures such as overpasses should be preserved wherever possible.

7.3.1 Management of contaminated excavated material (CC-2, CC-3, CC-22)

As indicated in Section 4 of the Part I of the Environmental Assessment Report, the environmental quality of the land in the area surrounding the Champlain Bridge in Montreal shows significant contamination. Materials excavated must be managed according to their environmental quality and the regulations in effect. During the design phases, the following measures are recommended:

Areas of excavation must be identified in the preliminary project design so that the areas can be characterized and an environmental management plan for the excavated materials can be prepared. Depending on the level of contamination found, options for managing the contaminated excavated materials will be as follows:

- Reuse on site, as long as CCME Canadian Soil Quality Guidelines (1999a) are met. This soil may be included in the fill used on federal land in the corridor;
- Shipment to existing treatment sites authorized to accept the materials;
- Shipment to specific elimination sites authorized to accept the materials;
- Shipment to sites authorized to accept the materials as fill outside the project footprint. In this case, the end use of the soil must also comply with the requirements of the *Land Protection and Rehabilitation Regulation* (Q-2, r. 37).

Encroachment of the western abutment of the Nuns' Island Bridge on the Island of Montreal must be minimized in order to restrict the work taking place in a contaminated sector near the River. The option of distancing the western abutment from the river's edge should also be considered by maintaining a 15-metre buffer strip at the river's edge.

The design of the Nuns' Island Bridge must consider the geometry of the Western sector containment system for the Pointe-Saint-Charles industrial park, where applicable.

7.3.2 Protection of wetlands and water quality (CC-1, CC-19 to CC-21)

Wetlands have been identified inside the work corridor (see insets in Figure 84). Since this area is federally owned, the promoter must ensure that the requirements of the federal policy on wetland conversation (EC, 1991) are met in the design. One of the strategies of the federal policy is:

> *The Federal Government will develop exemplary practices in support of wetland conservation and sustainable wetland use to be incorporated in the design and implementation of federal programs and in the management of federal lands and waters.* (EC, 1991)

The design must take into account the following sequence of actions:

1. Compensate for unavoidable impacts by adopting an approach based on zero net loss of function;

2. Reduce the encroachment to a minimum in the wetland areas;

3. Avoid impacts (by moving structures outside wetlands).

The design must also ensure that the project does not interfere with remediation of the riverbanks nearby and may even promote it. For example, the project should ensure that mature trees in the project footprint are maintained wherever possible.

In addition, the design of the structures must include consideration of sound road salt management through the following criteria:

- Meltwater must not drain directly into sensitive areas (wetlands, MBS and fish habitat);
- Highway structures should incorporate basins for storage and dewatering of runoff in the areas around the land sections of the highway;
- The geometry of the structures must limit the accumulation of snow and ice on the infrastructures to reduce the need for de-icing.

7.3.3 Fish habitat protection (CC-5, CC-6)

The spawning grounds near the fast-flowing water near Nuns' Island along the axis of the new bridge, the aquatic plant communities west of the Seaway dike and the shallow-water zones near the riverbanks (type 2, 4, 12, 16 and 22 zones in Figure 73 of Part I of the Environmental Assessment Report) are considered to have the highest fish habitat potential. The type 22 zone is also a potential lake sturgeon habitat. Table 71 presents the characteristics of each of the habitats and the potential losses, based on the scenario of greatest encroachment. Since the positioning of the piers has not yet been determined, it would be appropriate to consider the high-potential zones as sectors where permanent encroachment of piers should be minimized when designing the structures. On the other hand, the potential for use of the zones by special status species has also been considered. Table 72 summarizes the analysis of the effects on those species.

Based on the projected footprint of the project, permanent and temporary encroachment using the scenario of greatest encroachment in the sensitive areas accounts for between 1 and 5.5% of each of the habitats located in the study area. In non-sensitive zones, the percentage varies from 2 to 16%.

Because the work will be sequential (i.e. the piers will not all be built at the same time), the temporary annual encroachment should be below the calculated amount. Each temporary encroachment should not last more than two years. The effect of the temporary encroachments on the fish habitat will be considered for the entire duration of the work, however.

Flow velocities will also need to be modelled during the plans and specifications stage to ensure they are not impacted significantly by the bridge piers or by the temporary structures (jetty, cofferdams). The modelling must provide predictions for water levels both upstream and downstream, as well as flow velocities upstream, in way and downstream of the future bridge during low-water conditions, two-year flood levels and an equivalent flood level to the flows in the temporary structure design.

In general, migratory movements upstream take place at locations where flow velocity is weaker, i.e. the channel between Nuns' Island and the Island of Montreal, and along the shores of the Greater La Prairie Basin. Migration is not possible in the Lesser La Prairie Basin or the Seaway due to the presence of the St. Lambert locks. The migration corridors upstream are less vast and thus more susceptible to changes than those downstream, which are found in open water, in the central sector of the Greater La Prairie Basin.

During the construction and post-construction phases, the presence of temporary structures may modify the flow patterns and velocities, particularly in the migration corridors upstream, where the water is shallower. In fact, the flow velocity will potentially increase near the structures and the flow pattern will be modified based on the orientation of the structures.

However, in a similar case in which a jetty was planned, i.e. for the Highway 25 Bridge, the results of the simulations showed the following:

> [translation] “the erection of a jetty with nine openings 15 metres wide for each 50-metre section of jetty (35 m between each opening) during bridge construction would not modify the flow conditions to such an extent that fish movements upstream would be restricted or sensitive habitats identified upstream would be disrupted” (Lafrance et al., 2006).

The work methods must be assessed in terms of the increase in flow expected and the fishes' swimming speed, but at first glance it is possible that in light of the width of the river in the study area, construction of the jetty will not disrupt fish migration. Nonetheless a performance objective has been established for this element (see Table 85).

Table 71 Analysis of effects on habitat and estimated encroachment during bridge construction

Habitat	Description	Potential use of habitat			Potential for presence of special status species	Rarity/availability of habitat	Sensitivity/vulnerability of habitat	Value	Resilience	Preferred work method	Loss during construction (m^2)			Loss during deconstruction (m^2)			Overall (m^2)		
		Spawning (group)	Rearing	Feeding							Alter.	Disrup.	Loss	Alter.	Disrup.	Gain	Alter.	Disrup.	Loss
2	Lentic flow, 0-2 m depth, coarse substrate, vegetation present	High (calm water phytophile)	High	High	Chain pickerel Rosyface shiner	The aquatic plant zones are under significant pressure due to human impact on the banks of the St. Lawrence. A number of quality aquatic plant communities are present in the sector upstream of the study area, but availability of the habitat declines moving downstream of the area.	Aquatic plant communities are sensitive to long-term changes in water levels and changes in flow velocity. Spring (spawning) and summer (rearing) are the most sensitive periods.	High	Medium	(Work in fall) 1 – Temporary bridge on piers 2 – Temporary jetty on riprap	650		250				650	0	250
4	Lentic flow, 0-2 m depth, fine substrate, vegetation present	High (calm water phytophile)	High	High	Chain pickerel Rosyface shiner			High	Medium	(Work in fall) 1 – Temporary bridge on piers 2 – Temporary jetty on riprap	650		250				650	0	250
5	Lentic flow, 0-2 m depth, fine substrate, denuded of vegetation	Medium (calm water lithophile)	Low	Low		General habitat not providing conditions conducive to feeding or rearing abundant in this sector. Potential spawning habitat for a few species that can nonetheless find similar habitat nearby.	Low sensitivity/vulnerability habitat	Low	Medium	All methods are acceptable		650	250		105	40	0	755	210
9	Lentic flow, 2-5 m depth, fine substrate, denuded of vegetation	Low (calm water lithophile)	Low	Low				Low	High	1 – Temporary bridge on piers 2 – Temporary jetty on riprap		3,650	1,250		2,015	775	0	5,665	475
10	Lentic flow, 5-15 m depth	None	Low	Low		General habitat not providing conditions conducive to feeding or rearing abundant in this sector	Low sensitivity/vulnerability habitat	Low	High	All methods are acceptable		1,300	500				0	1,300	500
12	Lotic laminar flow, 0-2 m depth, coarse substrate, vegetation present	None	Medium	High	Chain pickerel Rosyface shiner	General habitat that provides conditions conducive to feeding or rearing is abundant in this sector	Sensitive habitat, particularly because it is adjacent to higher-value habitats	Medium	Medium	1 –Use cofferdams and barges	1,950		750	1365		525	3,315	0	225
13	Lotic laminar flow, 0-2 m depth, coarse substrate, denuded of vegetation	Medium (fast-flowing water lithophile)	Low	Medium		General habitat providing conditions conducive to feeding or rearing abundant in this sector. Type 13 has spawning potential but is lower in value than Type 22.	Sensitive habitat, particularly because it is adjacent to higher-value habitats	Medium	Low	1 - Use cofferdams and barges		1950	750		1,410	540	0	3,360	210

Table 71 (Cont'd) Analysis of effects on habitat and estimated encroachment during bridge construction

Habitat	Description	Potential use of habitat			Potential for presence of special status species	Rarity/availability of habitat	Sensitivity/vulnerability of habitat	Value	Resilience	Preferred work method	Loss during construction (m^2)			Loss during deconstruction (m^2)			Overall (m^2)		
		Spawning (group)	Rearing	Feeding							Alter.	Disrup.	Loss	Alter.	Disrup.	Gain	Alter.	Disrup.	Loss
16	Lotic laminar flow, 2-5 m depth, coarse substrate, vegetation present	None	Medium	High	Chain pickerel Rosyface shiner	General habitat providing conditions conducive to feeding and rearing abundant in this sector	Sensitive habitat, particularly because it is adjacent to higher-value habitats	Medium	Medium	1 - Use cofferdams and barges	4,550		1,750	1,090		420	5,640	0	1,330
17	Lotic laminar flow, 2-5 m depth, coarse substrate, denuded of vegetation	Low (fast-flowing water lithophile)	Low	Low		General habitat very abundant in this sector	Low sensitivity/vulnerability habitat	Low	High	All methods are acceptable		11,700	4,500		7,715	2,970	0	19,415	1,530
20	Lotic laminar flow, 5-15 m or > 15 m depth	Low (fast-flowing water lithophile)	Low	Low		General habitat abundant in the sector, a few rarer trenches (human in origin) that are attractive for overwintering	Low sensitivity/vulnerability habitat	Low	High	All methods are acceptable		2,600	1,000		1,105	425	0	3,705	575
22	Fast-flowing lotic flow, 0-3 m depth, pebble substrate	High (fast-flowing water lithophile)	Low	Medium	Lake sturgeon	High-value habitat for spawning but not rare in the sector	Habitat both sensitive and vulnerable	High	High	(Work in fall) 1- Use cofferdams and barges 2- Temporary bridge on piers	1,300		500	495		190	1,795	0	310
										TOTAL	9,100	21,850	11,750	2,950	12,350	5,885	12,050	34,200	5,865

Alter.: Alteration of habitat; Disrup.: Disruption of habitat; Loss: Loss of habitat.

[a] See Table 72 for the use of habitats by these species

Table 72 Environmental effects on fish special status species

Species (status) F: federal P: provincial	Habitat	Type of habitat	Use	Argument	Specific mitigation measure
American shad F: None P: Vulnerable	Spawning	None in the study area	The American shad is an anadromous species, i.e. it lives primarily in saltwater, but travels to freshwater to spawn in the water column (pelagic).	The American shad does not use any of the habitats present in the study area for spawning or feeding. However, the species could use the area as a migration route to known spawning grounds upstream of the sector. The bridge construction and post-construction phases could have an impact on the upriver travel of the fish, particularly due to the following environmental effects: vibration in the water, change in flow velocities and change in quality and tranquility of the habitat.	The measure to maintain flow velocities will allow the species to continue migrating upstream. The mitigation measures related to water quality, SS and use of explosives are considered sufficient to limit the effect on this species.
	Rearing	Study area	See migration		
	Feeding	None in the study area	Generally feeds on plankton organisms in the sea, but not or very little during its migration to reproduce in freshwater (MRNF 2010)		
	Migration	Study area	Two confirmed spawning grounds in western Quebec, i.e. downstream of the Carillon Dam in the Outaouais (upstream of the study area) and downstream of the Des Prairies River Dam, between Montreal and Laval (Bilodeau and Massé, 2005). The likelihood of a spawning ground located in Sainte-Anne-de-Bellevue has been under consideration for a few years, but further study is necessary (ERAS 2001). Given this information, the American shad could be found in the study area during its migration to the spawning sites between May and July and during its return to saltwater towards the end of August. The larvae travel down to the sea as soon as they hatch and are found in the study area until September (Robitaille, 1997).		
	Overwintering	Not applicable	No overwintering		
American eel F: Special concern P: Potentially at risk or vulnerable	Spawning	N/A	The American eel is a catadromous species (i.e. it lives in freshwater, but reproduces in saltwater) that reproduces in the Sargasso Sea (COSEWIC 2006) and could travel as far as the Great Lakes as it grows.	The American eel does not use any habitat in the study area for spawning, but could use the area as a migration route and feeding area. The bridge construction and post-construction phases could have an impact on the upriver travel of the fish, particularly due to the following environmental effects: vibration in the water, change in flow velocities and change in quality and tranquility of the habitat.	The measure to maintain flow velocities will allow the species to continue migrating upstream. The mitigation measures related to water quality, SS and use of explosives are considered sufficient to limit the effect on this species.
	Rearing				
	Feeding				
	Migration	Study area	Juveniles migrate upstream throughout the summer (COSEWIC 2006) and adults migrate downstream primarily from June to October (COSEWIC 2006). As they adapt easily to various habitats and are essentially omnivorous, they may use the study area as a migration route and feeding area.		
	Overwintering	Not applicable	The eel overwinters in mud and none of the habitats in the study area have this type of substrate.		

Table 72 (Cont'd) Environmental effects on fish special status species

Species (status) F: federal P: provincial	Habitat	Type of habitat	Use	Argument	Specific mitigation measure
Chain pickerel F: None P: Potentially at risk or vulnerable	Spawning	2-4-12-16	The chain pickerel is found in calm rivers and lakes with clear water. It feeds on fish and a variety of other prey, which it hunts in vegetation, and remains active all winter. The chain pickerel also reproduces in herbaceous areas along the shoreline that are flooded in spring (MRNF, 2008a). A number of sites in the study area are conducive to chain pickerel spawning and feeding, including types 2, 4, 12 and 16 habitats, which have significant vegetation and are located along the riverbanks.	The chain pickerel primarily uses aquatic plant habitats throughout its life cycle. All phases of the project have the potential to disrupt this species' life cycle, particularly due to the following environmental effects: vibration in the water, change in flow velocities and change in quality and tranquility of the habitat. Although the aquatic plant habitats are particularly vulnerable to human impact on the banks and their presence is in decline in the downstream sector of the study area, a number of aquatic plant habitats that may be used as chain pickerel habitat are present upstream, near the study area. Zones 2 and 4 are not likely to be permanently affected, since they are on the riverbank (potential for installation of a pier is low). Zones 12 and 16 will be affected by temporary and permanent encroachment, covering 1.5% of these habitats in the study area.	The mitigation measures related to water quality, SS and use of explosives are considered sufficient to limit the effect on this species. A compensation program will be developed to offset the losses (habitats 2, 4, 12 and 16).
	Rearing	2-4	See spawning		
	Feeding	2-4-12-16	See spawning		
	Migration	N/A	No migration		
	Overwintering	N/A	No overwintering		
Lake sturgeon F: None P: Potentially at risk or vulnerable	Spawning	22	Habitat 22 provides good spawning potential for fast-flowing water lithophile species, which includes the lake sturgeon. However, the type 22 habitat sector in the study area does not appear to be used for spawning by this species.	None of the habitats in the study area are particularly conducive to lake sturgeon feeding or rearing. Its presence in the study area may be attributed to travel in search of a feeding area or spawning ground upstream or downstream of the study area. Although no lake sturgeon spawning ground was identified in the study area, the type 22 habitat has potential as a spawning site. All phases of the project have the potential to disrupt this species' life cycle, particularly due to the following environmental effects: vibration in the water, change in flow velocities and change in quality and tranquility of the habitat. Indeed, deterioration of the quality of the two type 22 habitat zones in the study area would reduce their potential for use as spawning grounds for the sturgeon. In addition, the study area is a migration route to a spawning site identified upstream of the study area.	The following measure has been added to protect the potential habitat: Pier design should avoid, where possible, type 22 zones near the shores of Nun's Island, which are considered a potential lake sturgeon habitat. The measure to maintain flow velocities will allow the species to continue migrating upstream. In addition, the mitigation measures related to water quality, SS and use of explosives will make it possible to mitigate the effect on this species. A compensation program will be developed to offset the losses (habitat 22).
	Rearing				
	Feeding		The lake sturgeon feeds on a variety of organisms found in benthos and can feed in a range of habitats (Environnement Illimité Inc., 2003). None of the substrates present in the Greater La Prairie Basin are specifically suitable to feeding, owing to the lack of fine substrate, but the existence of sand throughout the coarse substrate in the Basin may be conducive to feeding by sturgeon.		
	Migration	Study area	The lake sturgeon is likely to migrate seasonally through the study area to reach a spawning ground previously identified in the Mercier Bridge area (La Haye et al. 2003).		
	Overwintering		This species overwinters in trenches at a depth of 8 to 16 metres, with a flow velocity below 0.8 m/s (Environnement Illimité, 2003). The two trenches (type 20) upstream and downstream of the Clément Bridge meet those criteria and could potentially be used by sturgeon for overwintering.		
Rosyface shiner F: None P: Potentially at risk or vulnerable	Spawning	2-4	The rosyface shiner is generally found in medium- to fast-flowing water. It spawns at shallow depths on gravelly, clean beds (Houston, 1994) and is therefore unlikely to spawn in the study area, as the conditions in the Lesser La Prairie Basin are characterized by low flow and relatively clogged beds and those in the Greater La Prairie Basin by substrates that are too coarse.	None of the habitats in the study area are particularly conducive to the rosyface shiner's life cycle, because this species usually prefers finer substrates. However, the types 12 and 16 aquatic plant habitats may be suitable for feeding. All phases of the project have the potential to disrupt this species' life cycle, particularly due to the following environmental effects: vibration in the water, change in flow velocities and change in quality and tranquility of the habitat. Although the aquatic plant habitats are particularly vulnerable to human impact on the banks and their presence is in decline in the downstream sector of the study area, a number of aquatic plant habitats are present upstream, near the study area.	The mitigation measures related to water quality, SS and use of explosives are considered sufficient to limit the effect on this species.
	Rearing				
	Feeding	12-16	The rosyface shiner is insectivorous, but can also feed on plant matter (Houston, 1994). Some of the habitats in the Greater La Prairie Basin would thus be suitable for feeding.		
	Migration	N/A	No migration		
	Overwintering	N/A	No overwintering		

- In addition, the construction specifications must be developed with the various restriction periods for work in water in mind. Periods of restriction will be identified for fish habitats felt to be sensitive (Table 71 and Figure 84) and will take into account the species of fish that are found in them and their use (reproduction, nurseries, migration, etc.). Ranges of protection will be adapted to the species and the fragility of the environment. Table 73 identifies the restriction periods for work in the fish habitat.

Table 73 Restriction periods for work in water

SECTOR	HABITATS (FIGURE 73)	PERIOD
On the right bank of Nuns' Island from Champlain Bridge to the eastern point (690 m), a distance of 90 m from shoreline; on the right bank of the Lesser La Prairie Basin (375 m), a distance of 90 m from shoreline.	Calm water phytolithophile (types 2 and 4)	April 1 to August 1
Clément Bridge Area of small islands 100 m from the right bank of Nuns' Island	Fast-flowing water lithophile (type 22)	April 1 to July 1
Entire shoreline of Nuns' Island	Types 12, 13, 16, 17 and 20	April 15 to June 15

The use of explosives in or near an aquatic habitat can have a number of adverse effects on fish and their habitat. The change in pressure caused by the shock wave of an explosion can affect the fishes' internal organs, particularly the air bladder, the organ that enables them to adjust their buoyancy to the depth they are at (Wright and Hopky, 1998; DFO, 2013). In addition, fish eggs and larvae can also be damaged or killed by the change in pressure. The extent of the damage caused to fish, larvae and eggs is a function of a number of biological factors, including the depth they are at, their size and their species. The extent of damage also depends on the type and quantity of explosive used and the distance the fish are from the explosion.

The change in pressure caused by the shock wave of an explosion can also affect the fish habitat by destroying living organisms in the substrate that are food for certain fish species. The extent of the damage is a function of the same factors as for fish (Wright and Hopky, 1998; DFO, 2013). In the case where the proponent cannot fulfill those requirements, DFO will be contacted in order to assess if an authorization in regard to section 32 of the *Fisheries Act* is required. Additional mitigation measures and follow-up programs on the effect of blasting on fish death could be requested.

The sediment dispersed in the habitat during an explosion can affect habitat components, such as water and substrate quality. Indeed, sediment suspension can make the water murky; reducing

quality, and eventually the sediment settles elsewhere and may fill in a clean substrate that could be home to a spawning ground (DFO, 2013). Furthermore, if there are contaminants in the substrate near an explosion, the possibility of resuspending contaminants could result in contamination of the water nearby and the surrounding environment.

If explosives are used in the various project phases, the guidelines given by Wright and Hopky (1998) must be respected, i.e. avoiding causing additional pressure in excess of 100 kPa (normal internal pressure plus 100 kPa) in the fish. If these guidelines cannot be followed, mitigation measures, such as restricting blasting during spawning periods, or compensation measures must be contemplated, according the magnitude of the expected impact. In addition, the mitigation measures described in the analysis of environmental effects should be sufficient to encompass the effects on the fish habitat.

At this stage, no data are available to determine the type of explosive or charge being contemplated or the requirements for explosives in the aquatic environment.

7.3.4 Avifauna (CC-15 and CC-16)

Depending on the geometry selected, the risk of avifauna mortality should be considered from the design stage. Lighting systems and overhead wires for mass transit system, where applicable, should be designed to limit the effects on nocturnal bird migration, particularly if a cable-stayed structure is selected.

7.3.5 Commercial ship traffic (S-16)

To permit safe passage of commercial ships, development of plans and specifications for component D2 must take into account the navigation clearance. A technical protocol must be negotiated prior to the start of work between TC, the SLSMC and the private partner, as applicable.

7.3.6 Sound environment (CC-17)

The noise study identified noise sensitive areas at the new bridge approaches in Brossard, Nuns' Island, Verdun and Sud-Ouest (Figure 84). Modelling of current noise levels ($Leq_{24hr,}$) made it possible to identify areas where noise mitigation measures will potentially be required, in accordance with the following objectives:

Table 74 Objectives for application of noise mitigation measures

CURRENT NOISE LEVEL (LEQ_{24HR})	DESIGN OBJECTIVES FOR DEVELOPMENT OF NOISE MITIGATION MEASURES
Below 55 dBA	Maintain current noise level, if possible, or maximum 55 dBA
Equal to or greater than 55 dBA	Acceptable increase of 1 dBA
Greater than 60 dBA	No increase allowed. Mitigation measures must bring the project noise level as close to 60 dBA as possible.

Once the geometry of the structures is known, the design should take into account the zones in which noise is deemed significant according to the traffic noise policy. The design criteria to be included are as follows:

- The plans and specifications must take into consideration addition of noise mitigation measures in these sensitive zones.
- The noise mitigation measures must wherever possible bring residual LAeq 24-hr. noise levels (Leq_{24h}) at dwellings and other sensitive areas as close as possible to the noise level considered acceptable, i.e. 60 dBA.
- Noise barriers should be built wherever possible within the boundaries of the Transport Canada right-of-way.
- The size of the measures selected (length, height) will be determined once the configuration is known, at the preliminary engineering phase. Appendix 5 presents various approaches suggested as noise mitigation measures.

7.3.7 Air quality (CC-23)

The design of the structures should take into account the relevance of using a smart traffic control system with sensors for air quality analysis at the local level (TC, n.d.).

7.3.8 Archeology (CC-4 and CC-18)

Although archeological inventories are planned in the upcoming phases of the project for the areas of potential, it is clear that the Le Ber site (BiFj-1) is located in the planned axis for Component D1a. The following measures must be considered in the design of Component D1a:

- Minimize the encroachment of the western abutment of the new bridge on the archeological site and ensure that it is outside the perimeter of the vestiges (pigsty foundations).
- Minimize the encroachment of the new alignment of René Lévesque Boulevard on the archeological site.

In addressing these two measures, a cost-benefit analysis will have to be performed in order to determine whether relocation of the infrastructures is more appropriate than relocating the archeological ruins.

Transport Canada will need to discuss development of the site's historical character with the Government of Quebec and the City of Montreal.

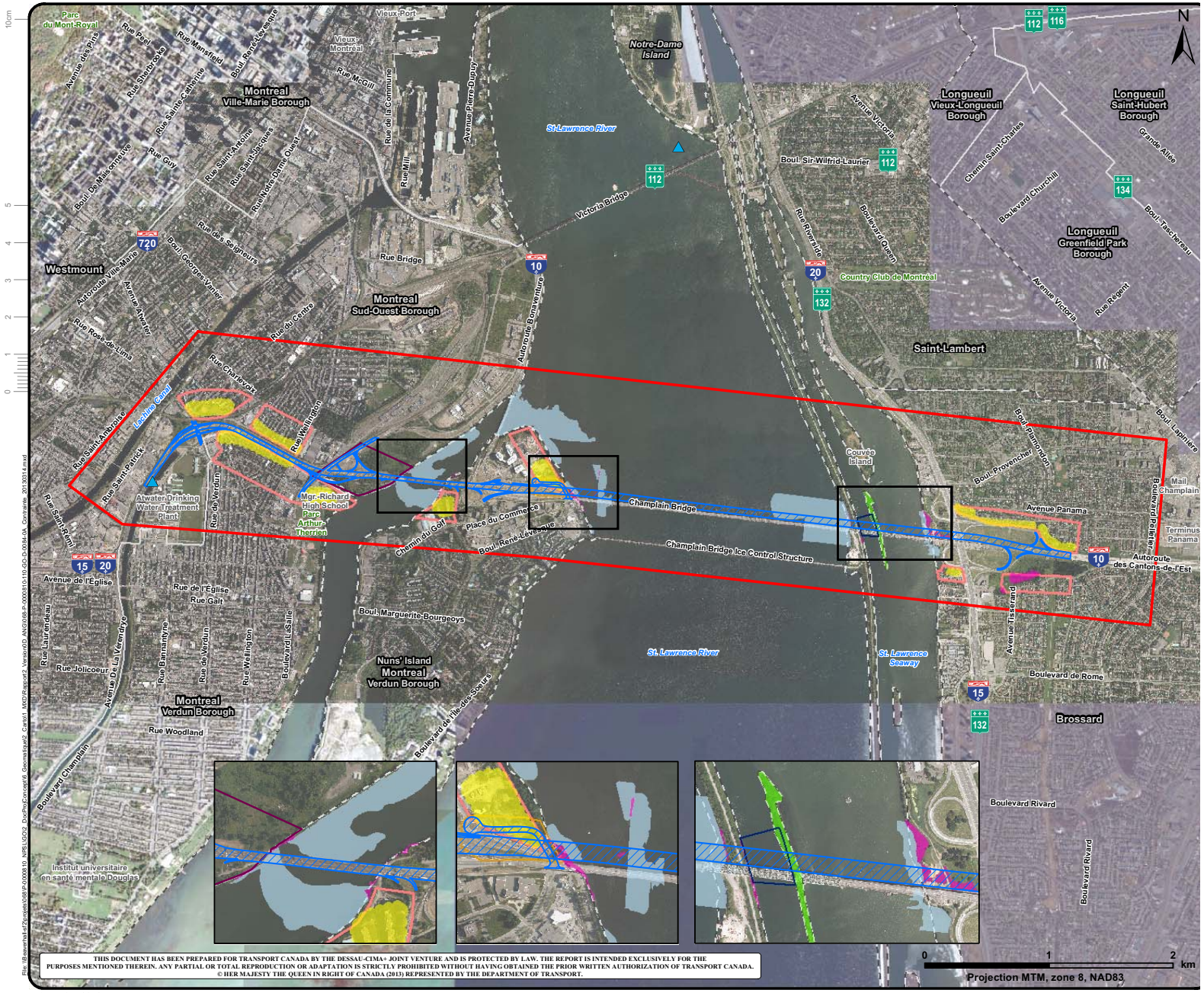
7.3.9 Integration of project into the environment (CC-7 to CC-14)

The Champlain Bridge is an emblematic feature of the Montreal and regional landscape. It is a striking landmark, particularly the segment over the Seaway, due to the elevated position of the structure. Its imposing length gives users a sense of discovering the Island's river location.

Approaching to the north provides an impressive view of downtown and the skyline, both during the day or at night, when the city lights up. The project design must ensure that the project integrates into the urban environment in order to preserve the existing strengths of the major infrastructure while improving on its weaknesses. The following measures are recommended:

- The New Bridge for the St. Lawrence should showcase the dominant role that it plays in the Montreal landscape and strengthen its effect as a visual landmark for the region, while having an appropriate aesthetic impact.
- The visual experience provided of the river and the city from the Bridge should be maintained. In particular, the use of visually porous guardrails could be made a priority to give users an unimpeded view.
- The project should enhance and strengthen the existing bicycle network and the views provided of the landscape.
- The residual space could be profitably used for landscaping that promotes the creation of a gateway to the city. This process must be tailored to the specific conditions in the western (Montreal), eastern (Brossard) and central (Nuns' Island) portions of the project. The Brossard segment provides more significant opportunities, considering the amount of residual space available. The developments would however have to incorporate restrictions related to the electrical transmission corridor.
- Montreal's horizontal links could be improved by taking into account the quality and dimensioning of the civil engineering structures (overpasses) at the Atwater, Wellington and LaSalle intersections in order to improve the connectedness of the boroughs of Sud-Ouest and Verdun. For example, the possibility of a horizontal link between the two boroughs could be considered, as well as a pedestrian connection on each side of the A-10 on Nuns' Island.
- Construction of the New Bridge for the St. Lawrence must not interfere with projects aimed at revitalizing the banks of the St. Lawrence.
- In Brossard, the civil engineering structures above Route 132 should showcase this segment, which marks a significant point in the road network, to the extent possible.
- Active transportation opportunities should be incorporated from the preliminary project design phase.

All of these measures are included in the actions that would contribute to optimal integration of the new bridge project into the contemporary urban context that focuses on quality of lifestyles, value of the riverfront and emblematic perspectives of Montreal's downtown.



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7.4 STANDARD MEASURES

Standard measures are proven mitigation measures taken, for example, from publications by agencies recognized in the field of environmental assessment. Three sources of standard mitigation measures were used for this environmental assessment:

- The standard mitigation measures proposed by the Department of Fisheries and Oceans for projects involving work in water (Table 75)
- MTQ General Specifications and Standards (2012; Table 76)
- MTQ Standards for Road Work (Tome II, 2011; Table 77)

The last two were chosen for reference purposes because they are recognized in the construction industry in Quebec. The standard measures identified in the latter two documents were written in a context of provincial regulation and accordingly will be adjusted at a later stage for the federal context (names of departments, legislation and other similar elements). For example, references to the Quebec Ministry of Transportation may be replaced with references to Canada's Department of Transportation.

As the MTQ General Specifications and Standards and Standards for Road Work are frequently revised, the latest versions will be those used during the work.

Once the preliminary design is completed, the standard environmental specifications published by JCCBI will also be considered, and the strictest measures applied.

Table 75 Standard DFO mitigation measures for work carried out in fish habitats

DESCRIPTION	NO	REQUIREMENTS
General	MPO 1	Perform work outside sensitive periods for fish species present in watercourses.
Temporary structures	MPO 2	Ensure, at all times, the free circulation of water and a sufficient volume of water to maintain fish habitat functions (feeding, nursery, spawning) downstream from the work area. Take the necessary measures to prevent impacts such as flooding, water recession, suspended matter, erosion, etc., upstream and downstream of the work area.
	MPO 3	Temporary structures must be protected from erosion by stabilization, e.g., suitable geotextile membrane or riprap. In addition, temporary structures must be designed to withstand any maximum flows likely to occur during the work period.
Control of erosion and sediment resuspension	MPO 4	Take all necessary precautions to prevent deposition of fine particulate matter into the aquatic environment beyond the immediate work area.
	MPO 5	Encourage the use of turbidity curtains to prevent sediment transport in the water.
	MPO 6	Dispose of excavated material at a site designated for that purpose.
	MPO 7	Do not carry out earthwork or excavation work close to water during flood periods or periods of heavy rain.
	MPO 8	Divert drainage ditches towards stable vegetated areas, located more than 20 m from the natural high water mark. If it is impossible to divert the ditch, potential sediment loading from the structures must be controlled by means of a suitable and effective system to prevent leaching.

Table 75 (Cont'd) Standard DFO mitigation measures for work carried out in fish habitats

DESCRIPTION	NO	REQUIREMENTS
Machinery	MPO 9	Prohibit stream fording by machinery.
Site reclamation	MPO 10	Restore the banks and beds of watercourses affected by the work to their original condition (grain size, streambed profile, etc.) following dismantling of the temporary structures on all disturbed sites.
	MPO 11	Stabilize all reworked areas, particularly on side slopes, as the work is completed. If more time is required for permanent stabilization, erosion control measures must remain in place in order to prevent erosion and capture any eroded material.
	MPO 12	Restore ditches damaged by machinery (damage to gradient, embankment shoulders, etc.).
	MPO 13	Limit the installation of riprap along the banks of watercourses up to the natural high water mark (2-year return period), and revegetate the riparian buffer starting at the riprap boundary using recognized bioengineering techniques favouring overhanging shrub and herbaceous layers. Replanting must be done as soon as possible after grading work is complete, with preference given to indigenous species.
Cofferdam installation	MPO 14	Give preference to the types of coffer-dams that minimize encroachment on fish habitat.
	MPO15	If the use of stone coffer-dams is justified, they must be constructed using clean granular material and a membrane must be installed to ensure that the structure is watertight.
	MPO 16	Before being returned to the river, water pumped outside the coffer-dams must be decanted or pumped into vegetation located over 15 metres from the river.
	MPO 17	Restrict encroachment to no more than one-third the width of the river, calculated from the natural high water mark.
	MPO 18	Recover any fish trapped in the coffer-dams and immediately return them to the aquatic environment to avoid fish mortality.
Installation of temporary jetties	MPO 19	Clean material must be used for the construction of a temporary jetty (including the surface of the jetty).
	MPO 20	Encroachment by the base of the temporary jetties must be limited to no more than one third of the width of the stream, calculated from the natural high water mark (HWM).
	MPO 21	Install a sediment collection mechanism on the downstream side of the temporary jetties during their installation and dismantling. The approaches used must take into account the stream flow of affected watercourses during the dismantling work.
Diking and pumping of water from upstream to downstream	MPO 22	Before being returned to the river, dike water pumped from upstream to downstream must be decanted or pumped into vegetation more than 15 metres from the watercourse.
	MPO 23	Install a structure (e.g., screen) at the opening of the pumping hose to prevent intake of fish.
	MPO 24	Direct the outlet of the pumping hose downstream to limit the risk of causing pockets of erosion to form along the shoreline.
Dismantling of existing work	MPO 25	Do not dispose of any debris, concrete waste or wet mortar in the aquatic environment. Any debris that accidentally enters the water must be removed as quickly as possible.
Temporary stream diversion	MPO 26	The free passage of fish must be maintained in the temporary stream diversion channel.
	MPO 27	Construct a minimum-flow channel in the temporary diversion to allow preferential flow during low-flow periods.
	MPO 28	Ensure even, continuous placement of riprap on the banks and bed of the temporary stream diversion channel to properly seal the substrate and minimize interstitial flow through the rock.
	MPO 29	Ensure a smooth connection between the downstream end of the temporary diversion channel and the natural stream to limit the risk of causing pockets of erosion to form in the opposite bank.

Table 76 Standard mitigation measures – From MTQ General Specifications and Standards (2012)

DESCRIPTION	SECTION	REQUIREMENTS
Clean-up and site reclamation	7.11	When the work is completed, the Contractor must: remove from the footprint not only its own equipment and material but all unused materials, scrap, waste, gravel, whole or crushed stone, wood, stumps and roots; clean-up equipment and materials locations; restore obstructed ditches and watercourses; repair or rebuild demolished or damaged fences and other necessary structures; and dispose of all materials without disfiguring the area in the vicinity of the work or related structures. Lastly, the Contractor must repair any damage to the work site, to public or private property affected by the work, to bodies of water, to camp sites, equipment storage sites, materials storage and supply sites, to the environment and to forest or agricultural land. The Contractor must also restore forest cover and on forest lands in the public domain.
Traffic management	10.3.1	Before and during the work, the Contractor must take the necessary measures to facilitate and direct the movement of vehicles on the road under construction and on detour roads made necessary by the construction work. Work signage must be maintained anywhere where there is a risk of accident or damage to structures under construction, either directly or indirectly, owing to the work. For the duration of the work, the Contractor must install along the route signage in compliance with *Volume V – Traffic Control Devices* of the Ministry of Transport's Standards for Road Works. In addition, the Contractor must use the "Traffic Control Person Ahead" sign (T-60) whenever a signal person is directing traffic. The Contractor must maintain location and guidance signage at all times. If the configuration of the work site requires the removal or relocation of this type of signage, the Contractor must indicate the equipment to be used in the signage plans. The contractor must always ensure safe passage for road users. When traffic must be maintained on the route under construction, the Contractor must maintain accesses to adjacent properties and provide regular road maintenance within the boundaries of the project. During a duly authorized, extended work suspension, the Contractor is released from performing regular road maintenance where traffic is maintained; however, the Contractor is not released from responsibility for its engineering structures or for any structure damaged during previous work or damage that may result from that work.
	10.3.4.3	Mobile variable message signs (VMS) must be functional throughout the construction period and inform users of real-time traffic conditions and obstructions
Environmental protection	10.4.1	Granular material used in construction of the engineering structures must not come from the bed of a body of water or its shores, or from any source situated within 75 m of the aquatic environment (stream, river, lake or ocean).
	10.4.2	An emergency spill kit must be available at all times and must include confinement sausages, absorbent rolls, sphagnum and the related containers and material (gloves, etc.) essential to address minor, accidental spills and ensure recovery and storage of contaminated material and management of contaminated soil and equipment. The kit must include a sufficient number of absorbent rolls to be able to cover the width of the body of water or to contain the petroleum product within a perimeter around the affected machinery. The kit must be easily accessible at all times for rapid response.

Table 76 (Cont'd) Standard mitigation measures – From MTQ General Specifications and Standards (2012)

DESCRIPTION	SECTION	REQUIREMENTS
	10.4.3.1	Release into a body of water of waste, oil, chemicals or other contaminants of a similar nature originating on the construction site is prohibited. The Contractor must dispose of all such waste and scrap, of whatever nature, in compliance with prevailing legislation and regulations. Parking and storage areas and other temporary facilities must be located at least 60 m from a water environment. The only land clearing permitted is that necessary for performance of the work. Refuelling and mechanical inspection of automotive equipment must not be performed within 15 m of a body of water. The Contractor must prevent all environmental contamination. Throughout the work, the free flow of water must be assured without producing negative hydraulic or environmental impacts. No watercourse may be permanently reduced in width by more than 20% as measured from the natural high water mark. A watercourse may not be widened for installation of parallel culverts.
	10.4.3.2.1	Work performed by the Contractor must not damage nearby lakes and watercourses including public and private ditches. To minimize the flow of sediment into lakes and watercourses, during the work the Contractor must build and maintain, where required, berm filters and sediment traps upstream from these environments. Furthermore, the Contractor must build and maintain, at the start of work, berm filters and sediment traps in a ditch that drains the work area, in compliance with the provisions of Chapter 9 "Temporary Environmental Mitigation Measures," *Volume II – Road Construction*, of the of the Ministry of Transport's Standards for Road Works. Temporary berm filters and sediment traps must be dismantled at the completion of work, and the area they occupy must be restored.
	10.4.3.2.2	To limit sediment flowing into bodies of water, the Contractor must install geotextile sediment barriers in compliance with the provisions of Chapter 9 "Temporary Environmental Mitigation Measures," *Volume II – Road Construction*, of the Ministry of Transport's Standards for Road Works. The geotextile must be tight and well-anchored and conform to the topography of the ground. Periodic maintenance must be performed on the barriers including removal of sediment accumulated against the membrane wall. Sediment barriers must be removed and recovered once stripped surfaces have been permanently stabilized. When barriers are removed, areas of sediment accumulation must also be cleaned and permanently stabilized.
	10.4.3.2.3	Water from dewatering excavations and coffer-dams must be discharged into a settling basin or a natural filter, such as an area of vegetation, in accordance with the following requirements: the settling basin must be designed based on the entry and exit flow; when the settling basin is 50% full, it must be cleaned; the natural filter must be located in a graminaceous field (grasses), in a bog or in forest litter; the Contractor must obtain prior authorization from the owner of the land, and must move the outlet regularly to distribute sedimentary deposits widely and avoid destroying vegetation; in all areas where there is a risk of erosion, the soil must be stabilized; if necessary a pipe could be laid, a geotextile membrane installed or riprap laid down; Temporary settling basins must be dismantled at the end of the work, and the area they occupied must be restored.

Table 76 (Cont'd) Standard mitigation measures – From MTQ General Specifications and Standards (2012)

DESCRIPTION	SECTION	REQUIREMENTS
	10.4.3.3	The access points for equipment to enter a body of water must be situated so as to minimize the impact on banks, soil and plant cover. They must be clearly identified and signed. The Contractor must avoid areas where the slope requires vehicles to brake hard. When dismantling temporary accesses, granular materials used in the construction of ramps must not be placed close to bodies of water. If the ground is damaged, it must be restored to prevent erosion.
	10.4.3.4	Not applicable
	10.4.3.5	In all areas of the site presenting a risk of erosion, the soil must be stabilized. To prevent erosion on the construction site: cleared land left exposed to the elements must be kept to a strict minimum in terms of both area and duration. Land clearing must be limited to the segment of the route under construction. Before the start of work, the Contractor must inform the Ministry of the exposure time and the segment of the route to be cleared or stripped; runoff from outside the construction site must be intercepted and directed off-site into stabilized locations for the entire construction period; slopes must be solidly stabilized in compliance with the plans and specifications. If work is suspended for the winter, preventive soil-stabilization must be completed in compliance with the plans and specifications.
Noise management	10.4.4.2	Activities at the construction site that produce noise levels above the level of ambient noise after work will be covered by a noise management program when performed near noise-sensitive areas. A noise-sensitive area is defined as an area where the noise environment is an essential element to the accomplishment of human activities. This is usually associated with residential, institutional and recreational uses.
	10.4.4.3	When a noise management program is required, the Contractor must appoint a noise management manager and forward the name to the Ministry before the first site meeting.
Tree clearing	11.2.5	Trees to be cut down are selected and marked by the supervisor. The Contractor must receive the supervisor's authorization prior to tree-felling. Grubbing consists in uprooting stumps to a minimum depth of 300 mm underground. The Contractor must avoid damaging the land or the root zones of trees and shrubs that have been retained and must restore the damaged area.
	11.2.6	All branches on trees in the work area that interfere with the movement of equipment are to be removed in order to prevent damage to equipment. Branches are considered interfering when there is no practical alternative to removal. For trees located outside the footprint with interfering branches that must be pruned, written permission of the owner must be obtained before the start of pruning or tree treatment. The Contractor must submit to the Ministry any intervention plan prior to performance of the work. Pruning of interfering branches must comply with BNQ standard NQ 0605–200 *Arboricultural and Horticultural Maintenance – Part IV: Tree Pruning*. If damage occurs during pruning work, the supervisor must be notified and will recommend appropriate tree treatments.

Table 76 (Cont'd) Standard mitigation measures – From MTQ General Specifications and Standards (2012)

DESCRIPTION	SECTION	REQUIREMENTS
Protection of trees and shrubs	11.2.7.1	Protection work concerns trees and shrubs whose projected leaf area is affected during performance of the work. The Contractor must take all necessary measures to protect from damage or mutilation all trees and shrubs whose conservation is called for in the plans and specifications.
	11.2.7.1.1	All heavy equipment movement, materials storage, excavation and backfill work and grubbing must occur at least 2 m from tree trucks and shrubs and at least 3 m from the edge of a wooded area. Only ground-level cutting is permitted within these buffers. At the start of work, a fence must be installed along the protection area and must be kept in place and in good condition throughout the work. The material used for the fence must provide an effective and unbroken boundary. It must be new and weather and tear resistant. Permitted colours are red and orange.
	11.2.7.1.2	Along excavations, damaged roots with a diameter of at least 10 mm of retained trees must be cleanly cut. For trees outside the footprint with roots that require cutting, written permission of the owner must be obtained before the start of root-cutting work.
	11.2.7.1.3	Watering of the rooting zone of retained trees is to be done if weather conditions contribute to rapid drying of the topsoil. Watering is to be done in the projected leaf area of trees to a penetration of at least 150 mm into the topsoil. Watering must be phased to facilitate ground penetration and prevent runoff of surface water. There are to be two waterings per week until the excavation is closed or for the duration of the dry spell in the growing season. Each tree needs, on average, 1,000 L of water per watering.
Vibration control	11.4.4.1.1	Particle velocity, measured in any of the three wave components (transverse, longitudinal or vertical), must not exceed: 25 mm/s for residential, commercial and other buildings; 50 mm/s for water wells. Near fresh concrete, the limits are: 5 mm/s during concreting and for a 24-hour period following concreting; 25 mm/s for 48 hours following the end of the 5 mm/s particle velocity period; 50 mm/s for 72 hours following the end of the 25 mm/s particle velocity period.
Waste material	11.4.7.2.1	Waste disposal outside of the footprint must be done in compliance with the *Environment Quality Act* (RSQ, c. Q-2) and corresponding regulations. Excess concrete and water used to clean concrete mixers must be disposed of in an area provided for this purpose and in such a way as to avoid environmental contamination. The site must be pre-approved by the Ministry.
	11.4.7.3.1	Disposal must be carried out in accordance with the *Hazardous Materials Regulations* and the *Environment Quality Act* (RSQ, c. Q-2).

Table 76 (Cont'd) Standard mitigation measures – From MTQ General Specifications and Standards (2012)

DESCRIPTION	SECTION	REQUIREMENTS
Dust suppressants	12.4	When vehicles travel over a granular surface and weather conditions generate excessive dust harmful to traffic and the environment (quantity of dust raised: over 40 mg/m³ during the passage of a vehicle), the surface must be treated with water or a certified dust suppressant. Dust suppression must be carried out near weigh stations and detour roads and on private roads used to transport borrow fill. Dust suppression on foundation materials is to be done with water only, until the results of granulometric analysis has confirmed that these materials comply with prevailing regulations. Any contractor applying a dust suppressant other than water before receipt of the granulometric results waives all right of recourse, unless samples are taken prior to application of the dust suppressant and in accordance with the procedure specified. Application of the dust suppressant is to be done on a level surface that has been prepared to suit the requirements of the granular surface.
	12.4.1.1	Products used for dust control must be composed of hygroscopic chloride salts such as calcium chloride or magnesium chloride. They must also meet the requirements of BNQ standard 2410–300 "Products Used as Dust Suppressants for Unpaved Roads and Similar Surfaces" and be certified by the Quebec Standardization Office (BNQ).
	12.4.1.2	Water used as dust suppressant must be free of litter and organic matter.

Table 77 Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
Site development	9.3.1	Areas set aside for site development should, where possible, be located on previously cleared or disturbed sites. Such areas must fulfil the following conditions: Site access roads, parking and storage areas, camps site offices and other temporary facilities must be located at least 60 m from a permanent watercourse or lake, and at least 30 m from an intermittent watercourse; During construction, all stripped areas must be stabilized, and an adequate drainage system must be designed in order to minimize the flow of sediment into nearby lakes, watercourses and wetlands. Granular material used for construction must come from a source (borrow pit) located more than 75 m from a body of water. Elsewhere on Crown land, in addition to complying with prevailing laws and regulations, authorizations for work outside the Department of Transports right-of-way must be obtained, including the signed approval of affected landowners. The location of temporary-use sites related to site operations (e.g., storage areas for excess materials) require special attention in order to minimize the environmental impact.
Maintenance and movement of machinery	9.3.2	Maintenance of machinery and vehicles as well as refuelling and oil replacement must be performed at least 15 m from a watercourse or lake (based on the natural high water mark). Contamination of the aquatic environment must be prevented and emergency measures in the event of an accidental spill must be developed. Where work is performed on Crown land, machinery maintenance may not be performed within 60 m of a watercourse. Refuelling and mechanical inspections of pumps, generators and stationary equipment may not be done within 15 m of a watercourse. Where necessary, fuel tanks must be installed on a waterproof structure with a minimum volume of 150% of the capacity of the tank as a safety margin. Excess concrete and water used to clean concrete mixers must be stored in an area provided for that purpose so as to avoid environmental contamination. The site must be pre-approved by the project supervisor.
Waste management	9.3.3.1.	Excess natural materials include excavated material composed of clay, silt, sand, gravel, rock and organic soil, as well as plant debris from land clearing, etc. Before disposing of excess materials outside the Department of Transports right-of-way, verify whether such material can be used for other project-related work such as reuse as backfill, slope reduction, constructing a visual screen or an anti-noise bund, restoring borrow pits or a former road corridor, and creating a wildlife habitat. Reuse of natural materials has the added advantage of reducing transportation costs of the project budget. Where appropriate, disposal of excess materials must comply with municipal regulations, the *Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains* (RRQ, c. Q-2, r. 35) and the *Act Respecting the Preservation of Agricultural Land and Agricultural Activities* (RSQ, c. S-41.1). Before transporting excess materials to a location outside the footprint, authorization must be obtained from the owners of the site or the necessary land must be acquired.

Table 77 (Cont'd) Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
	9.3.3.2.	Materials resulting from the demolition of structures include concrete, asphalt, wood, steel, etc. can be: reused in the project as backfill; recycled (steel and wood); If these materials are neither reusable nor recyclable within the footprint, they must be taken to a disposal site that complies with the *Environment Quality Act* (RSQ, c. Q-2) and the *Regulation Respecting the Land Incineration of Residual Materials*, RRQ, c. Q-2, r. 19). The Ministry encourages reuse of waste asphalt and concrete. Asphalt can be recycled in road embankments after being broken up into fragments smaller than 300 mm. The fragments must be completely covered with a minimum 300-mm-thick layer of compactable soil. In any road rehabilitation project, whether the road is asphalt-paved or not, excess materials from excavation or from removal of the pavement structure that are transported outside the footprint must be checked for contamination. The *Soil Protection and Contaminated Sites Rehabilitation Policy* and related regulations set out the procedure to follow. For fragmentation of asphalt mixes containing asbestos fibres, the applicable protective measures are found in Section 51 of the *Act Respecting Occupational Health and Safety* (RRQ, c. S-2.1), *Regulation Respecting Occupational Health and Safety* (RRQ, c. S-2.1, r. 19.01) and the provisions of the *Safety Code for the Construction Industry* (RRQ, c. S-2.1, r. 6). Concrete can be recycled in embankments if it are broken into fragments not exceeding 300 mm. Fragments must be homogeneous; any reinforcing steel must not exceed the size of the fragment. The fragments must be completely covered with a minimum 300-mm-thick layer of compactable soil. Only concrete and untreated wood may be recycled at a privately owned site. However, the site must receive prior approval from the MDDEFP and comply with municipal regulations. Disposal outside of the Department of Transports footprint must be accomplished in accordance with the *Environment Quality Act* (RSQ, c. Q-2), the *Regulation Respecting the Land Incineration of Residual Materials* (RRQ, c. Q-2, r. 19) and at an MDDEFS-approved site. MDDEFP considers it acceptable to integrate concrete and asphalt aggregates into the production cycle as raw material. Therefore, concrete aggregate can be recycled into the composition of new concrete, and recycled asphalt can be used for road surfaces and shoulders. Asphalt and concrete can also be temporarily stored in a quarry or sand pit, for use in the near future on a road project, subject to compliance with applicable rules and in accordance with the *Regulation Respecting Pits and Quarries* (RRQ, c. Q-2, r. 7). The regulation specifies that only concrete and asphalt may be stored, that a time limit must be set, that the waste must not interfere with site operations, that the land must be restored to its original condition and that permission must be obtained from MRNF or from the private owner.

Table 77 (Cont'd) Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
	9.3.3.3.	Hazardous materials include chemical waste, oil, paint and contaminated soil, as indicated in the *Regulation Respecting Hazardous Materials* (RRQ, c. Q-2, r. 32). Examples of hazardous materials used in construction work include bitumen, gasoline, diesel, oil, grease as well as any empty containers and waste associated with these materials. These materials must be managed in accordance with the *Regulation Respecting Hazardous Materials* (RRQ, c. Q-2, r. 32) and the *Environment Quality Act* (RSQ, c. Q-2).
	9.3.3.4	If contaminated soil is discovered during construction work, the excavated soil must be temporarily placed on an impermeable membrane (e.g., a geotextile membrane). The soil must be covered with an impermeable membrane to prevent leaching and contamination of nearby soil and evaporation of volatile substances (if present in the soil). Contaminated soil must be taken to an MDDEFS-approved site or treatment centre.
Protection of aquatic environment	9.4.2	Grubbing near a watercourse or a lake must be treated as a potential source of silting that could affect the quality of the aquatic environment. The steeper the slope, the greater the risk of silting. Therefore, grubbing in the footprint must not take place within 20 m of the natural high water mark (HWM). The purpose of this standard, from the *Regulation Respecting Standards of Forest Management for Forests in the Public Domain*, (RRQ, c. F-4.1, r. 7) (Crown lands) and the *Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains* is to minimize the risk of shoreline erosion by limiting exposure to the elements of shorelines that have been stripped of stabilizing vegetation. Within the 20 m the riparian strip, clearing must be kept to a minimum. Only ground-level cutting is permitted and plant cover must be preserved as long as possible before carrying out earthworks. Within 5 m of the natural high water mark, the Contractor may cut merchantable stems only (those with a diameter greater than 100 mm) and dispose of or recover for commercial or other purposes all trees and burnt or fallen trees. Shrubs and bushes less than 1.5 m in height at maturity must be retained. Within the next 15 m, the Contractor may cut all stems to ground level. Heavy machinery may not operate within the 20 m riparian strip as measured from the HWM, with the exception of areas authorized for the project. Lastly, the limits of the protection zones can be delineated with tape of different colours especially during winter land clearing.
	9.4.3.1	There are several simple measures that can be implemented for effective erosion control on disturbed surfaces and earthworks, whether this involves excavation or backfill. Small protected channels in the transverse sections of slopes, at the base of slopes and in other affected areas will make it possible to collect and control runoff in slopes that are susceptible to erosion. These channels are especially effective in clay materials. However, in mountainous regions, at the start of work, interceptor ditches should be created at the top of excavation slopes. The ditch will collect mountain runoff and direct it towards a stable location. The interceptor ditch will keep runoff from eroding soil from excavated material and prevent gullying on the new slope. In addition, notching the slope by means of crawler tracks compacts the soil and creates micro-structures which minimize erosion. The furrows created by notching must follow the contour of the slope, i.e., they should be perpendicular to the incline in order to reduce erosion. This method works well in clay soil but not in sandy soil, which does not hold the furrow as long, or in ground that is too steep and inaccessible to the machinery.

Table 77 (Cont'd) Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
	9.4.3.2	Temporary stabilization requires an erosion and sediment control plan. The plan must describe the protective work required to minimize erosion and the structures to be protected. Compacted surfaces must be scarified or harrowed before seeding. On Crown lands, regeneration of these areas with commercial species must be done within two years of the end of use. When runoff from ditches approaches a forest watercourse, the runoff must be diverted to an area of vegetation or into settling basins. This diversion must be effected at least 20 m from the watercourse to prevent runoff from flowing directly into the watercourse due to the flow velocity of the runoff. Between the watercourse and this first diversion, the water from the ditches must also be diverted before entering the watercourse. The purpose of these measures is to prevent sediment being deposited in the watercourse (see *Volume I – Road Design,* c. 2 "Environmental Setting"; see also *Volume IV – Roadsides*, c. 6 "Standard Environmental Mitigation Measures").
	9.4.3.3	Sediment barriers: Straw bale filters: At the base of a slope the receiving trench for the straw bales is dug along the contour so as to intercept runoff. The bales must be carefully wedged into the trench for a proper fit. If the cords around the bales are made of rope or string, they must be placed horizontally to avoid contact with the ground. Anchor posts for the straw bales must be flush with the top of the bale so that they do not pose a danger to workers. The anchor post can be of wood or metal though wooden stakes are more common. Bales must be inspected frequently, and damaged bales must be promptly repaired or replaced. Accumulated sediment must also be removed to allow the barrier to function properly. Lastly, The bales must be removed when they are no longer necessary, and the trench must be filled, levelled and stabilized. Geotextile barrier: Periodic maintenance must include sediment removal. The geotextile barrier is removed and recovered once stripped surfaces have been permanently stabilized. On a construction site, sediment barriers may be erected at the following locations: at the base of excavation on the outer side of the ditch; at the mid-point on slopes over 20 m in length (every 10 m for long, steep slopes); at the base of an embankment where there is a watercourse or a ditch; at the base of a slope where a source of water causes erosion (e.g., water seepage); around a temporary accumulation of unstabilized soil located within 60 m of a watercourse or a lake; across pits, perpendicular to the flow (with slight gradients and low water flows). Sediment traps and berm filters: The berm filter must be built across the ditch and high enough to allow the water to flow through. The material used is 70-20 gauge riprap containing no more than 5% of materials able to pass through a 80 μm sieve. For maximum efficiency, maintenance should be performed frequently on each of these structures. When the sediment trap is 50% full, the accumulated sediment must be removed and, when required, the filter material must be cleaned or replaced.

Table 77 (Cont'd) Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
		In order to limit sediment flowing into bodies of water or watercourses, at the start of work, one or more berm filters and sediment traps, depending on the length of the pits, the incline, type of soil, etc., must be installed in pits draining the work area. Settling basin: maintenance of settling basins must be frequent to ensure maximum efficiency. When the basin is 50% full, sediment must be removed and, when required, the filter material must be cleaned or replaced. Turbidity curtain: At times, it may be necessary to pump disturbed water into vegetation (over 30 m from the HWL) in order to minimize sediment suspension during construction and before removing the curtain. To be completely effective, the curtain must be located at a minimum of 5 m from the base of the embankment slope. Prior to installation, a bathymetric profile should be carried at the installation site so that the height of the curtain can be properly adjusted. There should an allowance of 1 m to 2 m over the height of the water column to compensate for fluctuations in water levels and for waves.
Protection of wetlands	9.5.3	Temporary construction in wetlands is prohibited whether for storage, parking, bypass roads or work areas. Such structures are to be located on stable land. Where it is impossible to do otherwise, precise studies by environmental specialists must be conducted with respect to the location, working method for construction of the sites and dismantling and redevelopment of temporary sites in wetlands. The redevelopment plan must provide for the complete rehabilitation of disturbed areas including removal of all materials and restoration of ground and drainage conditions to allow for recolonization of the site by vegetation.
Protection of sound environment	9.9.1.3	The SAE J1075 standard, "Sound Measurement – Construction Site," must be used to measure noise coming from the construction site. Measurement of sound levels produced by a particular piece of equipment on a construction site must be done in accordance with the measurement method described in *Measurement of Highway-Related Noise*, Final Report FHWA-PD-96-046, Federal Highway Administration (May 1996). This method stipulates that the sound sampling be made at a distance de 15 m from the equipment. In addition, given the range of operations performed by a piece of equipment, measurements should be taken for the different operating modes (up to four possible modes): stationary in a passive operation mode (e.g., a truck at idle); stationary in an active operation mode (e.g., a bulldozer lifting earth, debris, etc.); mobile in a passive mode (e.g., equipment moving to another area within a site; mobile in an active operation mode (e.g., a bulldozer moving while pushing earth, debris, etc.).
	9.9.1.4	Ambient noise must be determined before the start of work with at least two non-consecutive 24-hour noise samplings conducted in one week, at representative locations along the work area. Ambient noise must be assessed for the daytime (7 a.m. to 7.p.m.), evening (7.p.m. to 11 p.m.) and night (11 p.m. to 7 a.m.). Note that ambient noise is not to be measured within the footprint required by the work.

Table 77 (Cont'd) Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
	9.9.2	When it is necessary to mitigate the noise impact of a road construction project, a noise management program must be developed. The importance of the program is proportional to the duration of the work planned and consists of one or several comprehensive noise control programs and an acoustic monitoring plan.
	9.9.2.1	The comprehensive program must explain the methodology to be used to perform one or more construction site activities in compliance with the noise levels permitted in a noise-sensitive area. Any construction site activity that might generate noise that exceeds the ambient noise level without work near sensitive areas must be preceded by the implementation of a comprehensive program. The comprehensive program must include: a description of the area where the activity takes place including the location of noise-sensitive areas, housing types and number of floors and the location of ambient noise measurement points; an estimate of the noise levels produced by work in sensitive areas, in the form of tables showing current and projected noise levels, and an estimate of the time maximum noise levels will be exceeded; identification of mitigation measures, assessment of their effectiveness, implementation procedure for mitigation measures and time limits for installation; plans for the mitigation measures (walls, enclosures, etc.), if required.
	9.9.2.2	Where required, acoustic monitoring must be implemented at the start of work in order to monitor noise levels in the vicinity of the construction site. The acoustic monitoring plan must include the following elements: location of noise sampling sites (permanent or temporary sampling stations to be determined); type of equipment used for noise sampling; measurement methods and times.
	9.9.3.1	Below are some examples of mitigation measures that can be applied: prohibit work at night; plan the noisiest work during less sensitive periods (e.g., daytime); prohibit certain types of equipment near noise-sensitive areas; promote quieter working methods and soundproofed or electric equipment where possible; use equipment with good quality mufflers in working order; ensure that equipment used on the site is in proper working order; limit the power output of the equipment to what is required; limit the amount of equipment on the site to what is necessary; install variable-intensity reversing alarms (self-adjusting to ambient noise) and, if possible, install reversing alarms only on that equipment covered by the *Safety Code for the Construction industry* (RRQ, c. S-2.1, r. 6) of the *Act respecting Occupational Health and Safety*, c S-2.1, s. 03.10.12).

Table 77 (Cont'd) Standard mitigation measures – From MTQ Standards for Road Work (2011)

DESCRIPTION	SECTION	REQUIREMENTS
	9.9.3.2	Below are a few examples of mitigation measures that can be used to minimize noise propagation from a construction site: install temporary stationary noise barriers around the site, or mobile barriers around certain equipment; install acoustic sheets or curtains; arrange construction site trailers or heavy vehicles as noise barriers; increase the distance between noisy equipment and noise-sensitive areas.
	9.9.3.3	In the event of complaints about noise from the construction site, a complaints tracking system will enable the mediator to intervene promptly with both complainants and contractors in order to decide on the required corrective action.

7.5 SPECIFIC MITIGATION MEASURES

The following table presents the specific mitigation measures identified during the environmental assessment.

Table 78 Specific mitigation measures

NO.	MEASURE
S-1	As far as possible, keep a cycling link open during the official opening period between the South Shore and Montreal.
S-2	When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through CCG's Marine Communications and Traffic Services.
S-3	Start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area.
S-4	Where feasible, permanent noise barriers will be built before the start of work.
S-5	In the spring, install a fence along the construction perimeter (exclosure) and maintain it for the duration of the work.
S-6	At the end of summer and before start of work, capture brown snakes found on the exclosure and relocate them in suitable habitats outside the site. Relocation should be discussed with the appropriate authorities (MDDEFP).
S-7	As far as possible, avoid work in wetlands suitable for herpetofauna (Nuns' Island Bridge and Seaway Dike) or minimize work in these environments.
S-8	When working in urban areas, remove loose material and other debris on a daily basis from streets used by vehicles and machinery.
S-9	Maintain transportation vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants and to minimize gaseous emissions and noise.
S-10	Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log.

Table 78 (Cont'd) Specific mitigation measures

NO.	MEASURE
S-11	Ensure that catalytic converters on all vehicles are in proper working order throughout the construction period.
S-12	Ensure that contractors and sub-contractors are made aware of environmental concerns including air quality.
S-13	Isolate and preserve the organic soil layer so that it may be reused in places where the topsoil has been stripped.
S-14	Minimize encroachment of detours on private land. The private partner must come to an agreement with riverfront property owners with respect to encroachment on private land.
S-15	Install the materials required to mark boat lanes and bike paths in order to ensure safe passage of cyclists and recreational boaters.
S-16	The public will be informed of the work and the detours provided. Alternate routes will be proposed.
S-17	At least one, preferably two, accesses to Nuns' Island local network will be maintained at all times on the local road and highway network.
S-18	Work is prohibited during periods when the seaway is open without a memorandum of understanding between TC, SLSMC and the private partner.
S-19	Set up a system to monitor atmospheric contaminants in nearby residential areas (Verdun, Sud-Ouest, Nuns' Island and Brossard) during construction work.
S-20	When dewatering excavations or confined areas, pump out water and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal.
S-21	Work on and in the vicinity of the Couvée Islands migratory bird sanctuary must be performed in accordance with EC requirements.
S-22	Signpost areas where special status plant species are present and prohibit access during construction work.
S-23	Before the start of work, transplant specimens that could be affected by the work to an area that will remain undisturbed.
S-24	Initiate contaminant monitoring in aquatic environments during construction work (see section 9.8.2 for details).
S-25	Conduct archeological surveys in the sectors affected by the work (see Appendix 3).
S-26	Any discovery of archeological remains must immediately be communicated to MCCQ. Work at the discovery site should stop until an archeologist from the Ministry has completed a qualitative and quantitative assessment.
S-27	Favour the corridor footprint as the principal access to the construction zones and, as far as possible, limit the movement of machinery to the work areas located within this corridor.
S-28	The private partner must ensure that underground infrastructure is clearly identified in the plans and protected at the site.
S-29	In the sensitive area of the Le Ber site, if soil is excavated to construct the infrastructure base, backfill should be mechanically stripped down to the level of the ancient soil, and then a checkerboard dig of the areas affected should be conducted. Ancient soils are found at a depth of approximately 1 m in this sector. Exploratory stripping should be carried out under archeological supervision. If soil is not excavated for the construction of the new infrastructure, a protective layer could be spread over the existing soil to seal the site.

Table 78 (Cont'd) Specific mitigation measures

NO.	MEASURE
S-30	An archeological inventory survey will have to be conducted in the S-1 area of archeological potential. Should archeological remains be discovered, a site assessment will be made and a recommendation will be issued on the measures to be taken to either protect the site or conduct a dig.
S-31	Archeological monitoring is recommended in areas of archeological potential (see Appendix 3).
S-32	Excavated materials must be kept wet or covered with geotextile.
S-33	During excavation work, special attention must be paid to the presence of waste in the northern section of the Nuns' Island Bridge (Montreal) and, if necessary, such waste must be removed for disposal (e.g., empty barrels) to prevent it becoming a source of contamination.
S-34	Groundwater must be monitored for signs of work-related contamination. Periodic sampling will be conducted both upstream and downstream from construction zones on the Island of Montreal.
S-35	Establish a contaminated soil management plan and ensure that contaminated soil is treated or disposed of in accordance with prevailing regulations.
S-36	Contaminated soil must be piled on a waterproof surface and should be no higher than 2.5 m. The volume of each pile must not exceed100 m^3 and piles must be covered with a waterproof membrane.
S-37	The potential presence of methane in the soil must be taken into consideration in the design of the project's structures (temporary and permanent). Situations likely to cause methane to accumulate in an area (including beneath ground-level infrastructure) or in an enclosed space where there is also an ignition source or in a space or premises even occasionally occupied by a worker or any other person must be avoided.
S-38	Conduct an inspection before the start of construction of critical work likely to cause damage and adjust the working method accordingly.
S-39	Manage, relocate and if necessary add falcon nesting boxes depending on the sectors of activity. Retain the services of an expert on birds of prey to advise the private partner and encourage coexistence between workers and this species whenever possible.
S-40	Archeological remains found on the site during construction must be sent to MCCCF.
S-41	If work is required to temporarily divert the boulevard, a protective layer could be spread over the existing soil to seal the site.
S-42	Comply with DFO standards (1998) for the use of explosives near or in aquatic environments.
S-43	If it is not possible to comply with DFO requirements regarding explosives, authorization to destroy fish by means other than fishing must be obtained from DFO.
S-44	Negotiate and sign a lease with SLSMC to occupy the space required for the work.
S-45	Isolate water affected by work in the littoral sector of the Aqueduct Canal from raw water needed to supply the filtration plant by a method that minimizes sediment suspension from the canal bed.
S-46	The private partner must ensure that no contamination reaches the property of the Aqueduct Canal whether via storm sewers, contaminated soil, leachate from contaminated soil or any other form of contamination.
S-47	If work is required near the Aqueduct Canal, this work must be performed within a contained enclosure in order to prevent suspended solids from spreading into the air and water.
S-48	Access to the banks of the Aqueduct Canal will be prohibited.
S-49	If barges are used on the Aqueduct Canal, the following measures are required: - No combustion engine may be used in the waters of the canal - Launching ramps are prohibited. Barges must be raised by crane.

Table 78 (Cont'd) Specific mitigation measures

NO.	MEASURE
S-50	All work on or near the Aqueduct Canal must be approved by the City of Montreal. Additional measures may be identified at a later date.
S-51	Debris is to be recovered by means of a tarpaulin stretched under the work area and removed a soon as possible.
S-53	Establish a working method that limits resuspension of contaminated sediment when working in water (e.g., excavation performed within a coffer-dam or protective curtain).
S-54	Immediately remove excavated sediment whose contaminant concentration surpasses established criteria to approved sites.
S-55	Excavated sediment that cannot be removed must be immediately placed for temporary storage on a waterproof surface and covered for protection from the elements (e.g., sediment from uncharacterized piers).
S-56	Temporary structures in watercourses must be stabilized for protection against erosion with, for example, a geotextile membrane or riprap. Furthermore, these structures must be designed to withstand flooding (and ice loading) which may occur during construction.
S-57	Fires and waste burning on or near the construction site is prohibited at all times.
S-58	Where possible, no isolated machinery or gas-powered equipment is to remain on a coffer-dam, a jetty or in the 60-metre riparian strip along watercourses and lakes during the closing hours of the site. If it is not possible to meet this requirement, environmental measures must be applied (monitoring, etc.).
S-60	The operations site must be free of waste at all times including empty containers of any kind unless they are stored in a sealed repository designed for this purpose.
S-61	In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams; - Notification of municipalities downstream with water intakes that could be affected by the spill; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent berms); - Clean up of the affected area.
S-62	The private partner must establish an alternate transportation system and organize parking near the worksite restricting access to the local network.
S-63	Use adequate signage and impose appropriate maximum speeds to reduce dust emissions on access roads and work surfaces.
S-64	Place tarpaulins on trucks.
S-65	Favour a route for transporting materials that avoids residential neighbourhoods.
S-66	GHG emissions during the work will be offset to make the worksite "carbon neutral". During the construction phase, annual emissions will be calculated based on the number of kilometres travelled by the machinery and transportation of materials and excavations. Compensation may take the form of buying carbon credits or of carrying out independent projects.
S-67	Before the start of work, develop and implement spill response procedures.

Table 78 (Cont'd) Specific mitigation measures

NO.	MEASURE
S-68	Use vegetable oil in machinery that will be used for long periods on or near water.
S-69	When contamination levels exceed criterion B of the *Quebec Soil Protection and Contaminated Sites Rehabilitation Policy*, all trucks leaving the worksite must pass through a vehicle wheel-washing facility.
S-70	In the event of a spill on land, the emergency response plan will be implemented. This plan includes: - Prompt notification of Environment Canada (1-866-283-2333) MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response team; - Elimination of the source of the spill; - Implementation of environmental protection measures (absorbent material); - Clean up of the affected area. - Disposal of contaminated soil.
S-71	Check for peregrine falcon nesting on the bridge before the start of work. If there are nesting birds, organize a 250-metre exclusion zone centred on the nest until the end of the nesting period, or approx. 75 days after egg-laying.
S-72	Work with Environment Canada's Peregrine Falcon Recovery Team on an appropriate way to install nesting boxes. Peregrine falcon nesting boxes must be moved to or installed on the new bridge or a suitable site in the vicinity.
S-73	Observe the current provisions of SLSMC's land use lease.
S-74	Keep boaters informed through notices to shipping, and once the work of removing existing bridge piers is completed carry out a bathymetric survey of these locations.
S-75	Restore the bed of the watercourse to its original condition. In exceptional cases, piers must be reduced to at least 2 m below the low water level; reference zero on the nautical chart (ZC).
S-76	Perform work in water in an enclosed, dry area.
S-77	Ensure that there are no migratory bird nests or habitats of at-risk species in these locations. Should this be the case, act in compliance with prevailing laws and regulations.
S-78	During restoration of abandoned sections, promote renaturalization with a suitable substrate to foster the growth of natural vegetation. Where natural recovery is not possible, native species will be planted or seeded.
S-79	When developing deconstruction plans and specifications, materials characterizations must be conducted to identify and quantify those areas containing asbestos, lead or any other contaminant. Should these substances be detected, actions must be determined to deal with this situation.
S-80	When critical work is being performed, personnel qualified to use the emergency kits will be permanently on site.
S-81	Asphalt debris must not be reused in aquatic environments.
S-82	The bridge operator should consider switching off architectural lighting (abutments, piers, cable-stays) during the spring and autumn migration periods, especially when visibility is poor, without compromising safety standards. Adjusting lighting of the cable-stays could reduce the number of birds colliding with the stays; to this end, flexibility should be incorporated into the design of the lighting system to better adapt it to environmental needs (aesthetic, light pollution, bird collisions, navigational aids and air traffic).
S-83	Develop the area around the new infrastructure so as to create a suitable habitat for the brown snake.

Table 78 (Cont'd) Specific mitigation measures

NO.	MEASURE
S-84	Consider installing permanent barriers to prevent roadkill of the brown snake in those areas where there is most risk.
S-85	Develop the area around the new abutments so as to create a suitable habitat for herpetofauna.
S-86	Before the start of work, set up an air sampling station on Nuns' Island.
S-87	Implement a management program for de-icing salt that minimizes use and maintains safe driving conditions.
S-88	The bridge operator will be responsible for informing the public of obstructions and alternate routes.
S-89	Observe the requirements of SLSMC's land use lease during maintenance and coordinate work with SLSMC.
S-90	Where available, use equipment fitted with a dust collection system during maintenance.
S-91	Use tarpaulins during dust-producing work.
S-92	Comply with dust emission standards of *Regulation 90 Respecting Air Quality* for work performed in Montreal, and the standards of the *Clean Air Regulation* of the Government of Quebec in Brossard.
S-93	Since work will be carried out in the same location, the private partner will need to plan construction on Montreal Island in collaboration with the operator of the Western sector containment system in the Sud-Ouest Business Park.
S-94	Meltwater will not be directly discharged into sensitive areas such as wetlands.
S-95	Bear in mind MDDEFP's guidelines for managing concrete, brick and asphalt from construction and demolition work and residue from the free stone sector.
S-96	Marine equipment used to carry out the work and the personnel working aboard such equipment must comply with the provisions of the *Canada Shipping Act, 2001* (2001, c. 26) and its Regulations.
S-97	Contact CCG at 1-800-463-4393 or cell phone *16 to report any marine emergency.

7.6 COMPENSATION

7.6.1 Fish habitat

Based on the scenario of greatest encroachment described in the pre-feasibility study concerning the replacement of the existing Champlain Bridge, the project for the New Bridge for the St. Lawrence (construction of new bridges and deconstruction of old bridges) will result in permanent habitat losses of approximately 5,865 m^2 of, habitat disruption of approximately 34,200 m^2 and harmful alteration approximately 12,050 m^2. The following table presents a summary of harmful alteration, disruption and destruction of fish habitat.

Table 79 Summary of fish habitat losses (rounded).

HABITAT TYPE	BALANCE		
	Alteration (m^2)	Disruption (m^2)	Loss/Gain (m^2)
2	650	-	-250
4	650	-	-250
5	-	755	-210
9	-	5 665	-475
10	-	1 300	-500
12	3 315	-	-225
13	-	3 360	-210
16	5 640	-	-1 330
17	-	19 415	-1 530
20	-	3 705	-575
22	1 795	-	-310
TOTAL	12 050	34 200	5 865

The calculation assumptions used for this summary are based on a scenario of greatest encroachment:

- Losses represent total losses for each habitat type (Table 71) due to construction of piers for the New Bridge for the St. Lawrence and for the Nuns' Island Bridge.
- A factor of 2.6 was chosen for the estimate of temporary losses during construction and during removal of existing bridge piers (as an indicator).
- For the temporary structure in the Lesser La Prairie Basin, it was decided to limit encroachment by installing a bridge on piles rather than a jetty.

Habitat types 2, 4, 12, 13, 16 and 22 are considered sensitive. The likelihood of permanent encroachment in types 2 and 4 is considered low as these are shoreline habitats. As for types 12, 13 and 16, losses will need to be offset and the habitats protected so that nearby higher value habitats are not harmed. These habitats could be compensated by smaller, higher value habitats. Type 22 habitats must be protected or compensated. Depending on the configuration of the piers, it is possible to limit the number of piers in this habitat to two rather than four.

The general outlines of the fish habitat compensation program will be developed in the coming weeks and submitted to DFO. This summary of fish habitat losses will need to be recalculated following the preliminary engineering stage, and the program will be finalized in collaboration with DFO stakeholders. The program will take habitat losses into account and will meet the requirements of the *Fisheries Act.*

7.6.2 Wetlands

Based on a scenario of greatest encroachment, construction work for the New Bridge for the St. Lawrence is likely to lead to a loss of 6,300 m^2 of wetlands, mainly emergent nearshore marshes and one common water reed marsh. The exact size of the area will be known once preliminary engineering is complete. The general outlines of the compensation program will be developed in the coming weeks. The purpose of the program will be to compensate for losses of ecological functions of the wetlands (see Table 80). The environmental compensation plan will be submitted to Environment Canada for approval.

Table 80 Summary of ecological functions in wetlands affected by the project

COMPONENTS	EMERGING RIVERSIDE MARSHES	COMMON REED MARSH
Location (Appendix 6 of the first part of the Environmental Assessment Report)	Zones 11 33, 34,36, 37, 38 and 42	Zone 30
Surface area of the study area (m^2)	7,600	5,880
Potential losses (m^2)	2,000	4,300
Principal composition	Perfoliated eupatorium (11) Spotted jewelweed (33) Common reed (34, 37, 38) Reed phalaris (38, 42) Narrow-leaved cattail (36)	Common reed It is well known that areas invaded by invasive species, such as the common reed, are often dense and impenetrable. An area thus transformed results in a degradation of the ecological process and functions, in addition to having detrimental effects on the flora and fauna
Current functions	Fish habitat Faunal habitat Filtration	Protection against erosion Filtration
Lost functions	Fish habitat Faunal habitat Filtration	Protection against erosion Filtration
Argument	The probability of loss is slim considering the riverside location of these areas.	The bridge approach on the Brossard side could encroach upon this area.

The summary of wetlands losses will need to be recalculated following the preliminary engineering stage and the program will be finalized in collaboration with Environment Canada stakeholders so that it meets the requirements of the *Federal Policy on Wetland Conservation* (EC 1991).

8 OTHER EFFECTS OF THE PROJECT

8.1 FUTURE CHANGES IN ATMOSPHERIC EMISSIONS

As noted in Part I of the environmental assessment (section 4.1.11.5), it is difficult at this stage to establish traffic parameters for the new structure and, therefore, what traffic flow will be. Volume will depend in part on the provision of public transit and the kind of transport proposed. Since atmospheric emissions associated with highway transportation are primarily a result of traffic speed and flow, a simulation was conducted of changes in GHG emissions during the morning rush hour, in both directions, with variations in vehicle speed and volume compared to the 2012 parameters. Figures 85 and 86 present changes in GHG emissions based on variations in speed and flow compared to the situation in 2012 for the morning rush hour into Montreal and toward the South Shore respectively. As seen in these two figures, it is possible that, despite an increase in traffic flow during rush hour, GHG emissions will decrease if the increase in flow is accompanied by greater fluidity, or speeds higher than was the case in 2012. As the project moves forward, it will be possible to set traffic speed and flow parameters for the future scenario and thus determine changes in GHG emissions and other atmospheric contaminants compared to the situation in 2012.

Figure 85 Change in GHG emissions based on variations in speed and flow compared to 2012 for the morning rush hour toward Montreal

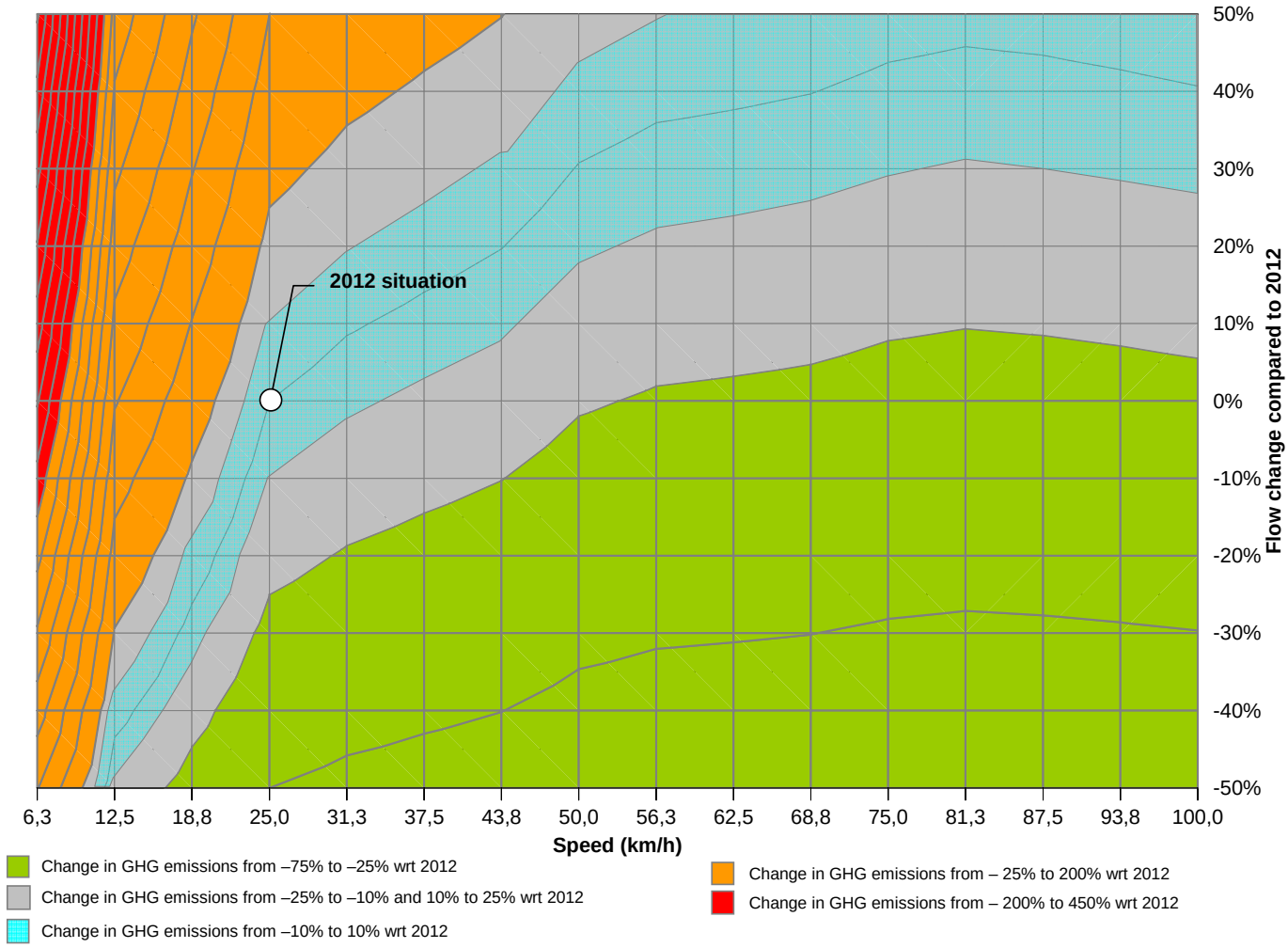
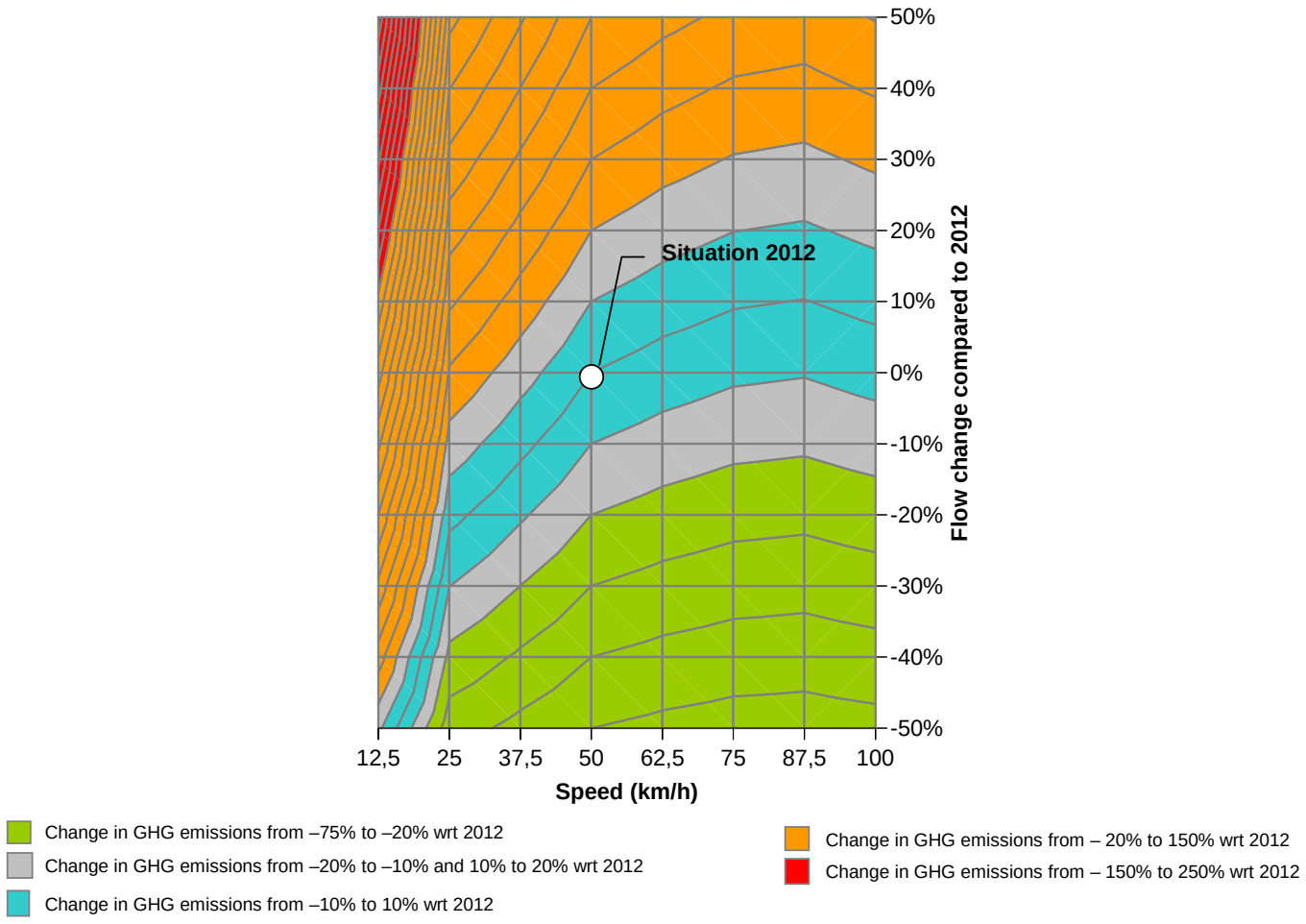


Figure 86 Change in GHG emissions based on variations in speed and flow compared to 2012 for the morning rush hour toward the South Shore



Preliminary use assessments for 2026 indicate that quantities of GHGs and atmospheric contaminants generated by traffic could increase by approximately 20%. As mentioned above, for a clearer picture of the situation, more accurate modelling taking into account a number of variables that are not yet known (configuration, speed, impact of Highway 30, modal shift, improvements in vehicle performance) will need to be conducted once preliminary engineering is sufficiently advanced.

8.2 CUMULATIVE EFFECTS

Cumulative effects refers to the environmental effects resulting from a combination of direct or indirect effects that one project has with those of other previous, current, planned or, even possibly, foreseeable projects or activities.

Assessing the cumulative effects requires taking into account certain concepts that differ from the concepts for assessing "direct" effects. For instance, the assessment of cumulative effects must be carried out over a larger area (regional) and over a longer period of time into the past and future, and must take into account interactions with other actions, past, present and future, not just those caused by the sole action that is the topic of the review. Aside from those differences, assessing the cumulative effects is fundamentally similar to the assessment of direct environmental effects and often relies on established environmental impact assessment practices.

The objectives of analyzing cumulative effects are as follows:

- Determine whether the effect caused by the study project gradually adds to the effects of other actions, past, present or future;
- Determine whether the project effect, combined with other effects, may result in a significant change, whether now or in future, in the valued ecosystem components following the application of the mitigation measures for the project.

The approach used was adapted from the approach presented in the Canadian Environmental Assessment Agency's *Cumulative Effects Assessment Practitioners' Guide* (Hegmann et al., 1999). The steps are as follows:

1. Identify regional issues:
   - Identify valued environmental components (VECs) and their reference state;
   - Establish spatial and temporal boundaries;
   - Identify past, present and future projects.
2. Analyze cumulative effects:
   - Identify interrelationships between the project, other projects and the VECs;
   - Identify mitigation, monitoring and follow-up measures;
   - Assess the significance of the cumulative residual effects.

8.2.1 Identification of regional issues

The corridor and adjoining area of the New Bridge for the St. Lawrence have been the topic of numerous studies over the years. The current environment is well documented, as shown in Section 4, which describes the receiving environment. During public consultations held prior to the start of the effect analysis process, members of the public were able to voice their concerns. This has contributed to the identification of regional issues on which the project could have a cumulative

effect (see Table 81). Each issue has distinct spatial boundaries. The past time boundary was set at 2008, while the future boundary was set at 2030, except for traffic, where the boundary was set at 2026, the horizon established in the MTQ's most recent transportation plan.

Table 81 Identification of regional issues

ISSUE	VEC	INDICATOR	SCOPE
Water	Water quality Sediment	SS, metals, hydrocarbons and PAH loads	St. Lawrence River, from the La Prairie Basin to the Boucherville Islands
			2008-2030
Quality of life	Infrastructures	Network congestion	Local and regional road networks (Montreal and Montérégie)
			2008-2026
	Sound environment	Noise level	Local study area 2008-2030
	Air quality	Suspended solids	Local study area
			2008-2030
Special status species	Habitat	Habitat losses (brown snake, peregrine falcon)	Habitat of species
			2008-2030

8.2.1.1 Water quality

Since the 1980s, water quality in the St. Lawrence River has been monitored (Groupe-conseil Roche, 1982). The St. Lawrence supplies water to a number of municipalities upstream of the project and a great deal of effort has been taken over the years to improve the water quality. The construction activities may affect areas where the sediment is contaminated and lead to circulation of chemical contaminants in the river water. In addition, all of the work near the river could lead to an increase in suspended solids.

8.2.1.2 Quality of life

Quality of life as it pertains to congestion, the sound environment and air quality is an issue of concern to residents who live nearby and to users who take the regional road network. Repairs are required to a variety of regional road infrastructures because they are reaching the end of their useful lives and this will negatively affect quality of life. On the other hand, some new infrastructure is now complete and being used (Highways 50, 30 and 25). The project will affect those components during the construction period, some of which may persist during the operations phase.

8.2.1.3 Special status species

The study area encompasses the habitat of a few special status species. The brown snake and the peregrine falcon were identified as issues of concern for the analysis of cumulative effects. The brown snake, which is likely to be designated threatened or vulnerable at the provincial level, is the rarest of Quebec snake species as it is found only in the Montreal area. The peregrine falcon, a species of special concern under the *Species at Risk Act*, may use human-made structures for nesting, including the current Champlain Bridge.

8.2.2 Past, present and future projects

Table 82 shows past, present and future projects identified in the vicinity of our study area that are interrelated with the issues being studied. Only major projects have been identified. In general, they consist primarily of road projects and commercial and residential developments.

8.2.3 Analysis of cumulative effects

The effects of past, present and future projects were assessed briefly, taking into account the residual effects of the New Bridge for the St. Lawrence project. Table 83 describes the cumulative effects and proposed specific mitigation measures.

The analysis of cumulative effects shows that, for this project, no significant cumulative effects are expected once the mitigation measures for the project have been implemented.

Table 82 Identification of past, present and future projects

PROJECT (PROMOTER)	PERIOD	EFFECTS OF PROJECTS ON VALUED ENVIRONMENTAL COMPONENTS		
		WATER/SEDIMENT QUALITY	HABITAT USED BY SPECIAL STATUS SPECIES	QUALITY OF LIFE INFRASTRUCTURE/ SOUND ENVIRONMENT/AIR QUALITY
Reconstruction of Turcot Interchange (MTQ)	2013-2018	-	Disruption of habitat used by the brown snake (St-Jacques Escarpment)	Road congestion due to detours and partial closures (regional network)
Upgrading of Atwater Plant (MTL)	2008-2013	-	-	Traffic increase during construction work (local network)
Contaminant containment at the Pointe-Saint-Charles industrial park (GC)	Ongoing	Mobilization of contaminants in the surface water	-	-
Redevelopment of the Bonaventure Expressway (MTQ/MTL)	2012-2018	Increase in SS in the surface water	-	Road congestion due to detours and partial closures (regional network)
Wind farm in the St. Lawrence (Private)	To be determined	Increase in SS in the surface water	-	-
Work on the Seaway (SLSMC)	To be determined	Mobilization of contaminants in the surface water	-	-
Conversion of CN shops (Private)	2013-2018	-	-	Increased traffic following construction of 850 new housing units (local network)
Work on the spillway – St. Lambert Locks (SLSMC)	2008-2013	Mobilization of contaminants in the surface water Increase in SS in the surface water	-	-

Table 82 (Cont'd) Identification of past, present and future projects

PROJECT (PROMOTER)	PERIOD	EFFECTS OF PROJECTS ON VALUED ENVIRONMENTAL COMPONENTS		
		WATER/SEDIMENT QUALITY	HABITAT USED BY SPECIAL STATUS SPECIES	QUALITY OF LIFE INFRASTRUCTURE/ SOUND ENVIRONMENT/AIR QUALITY
Decontamination of Bay 103 - Port of Montreal (MPA)	2006-2007	Mobilization of contaminants in the surface water Increase in SS in the surface water	-	-
New wharfs at the Port of Montreal (MPA)	2009-2011	Mobilization of contaminants in the surface water Increase in SS in the surface water	-	-
BCE Campus – Nuns' Island (Private)	2007-2009	Increase in SS in the surface water	-	Increased traffic following arrival of 3,000 employees (local network)
Griffintown development (Private)	2012- +	-	-	Increased traffic following construction of over 3,000 housing units (local network)
Redevelopment of junctions for Route 132 and Highways 20 and 25 in Longueuil (MTQ)	2008-2013	-		Road congestion due to detours and partial closures (regional network)
Pointe Nord development	2012-2016	Disturbance to banks and increase in SS in surface water	Disturbance of brown snake habitat along the shoreline	Increased traffic due to construction of more than 600 housing units (Nuns' Island local network). Construction will generate dust and noise.

Table 82 (Cont'd) Identification of past, present and future projects

PROJECT (PROMOTER)	PERIOD	EFFECTS OF PROJECTS ON VALUED ENVIRONMENTAL COMPONENTS		
		WATER/SEDIMENT QUALITY	HABITAT USED BY SPECIAL STATUS SPECIES	QUALITY OF LIFE INFRASTRUCTURE/ SOUND ENVIRONMENT/AIR QUALITY
Residential and commercial construction throughout the territory (Private)	2008-+	-	Loss of habitat used by the brown snake (Island of Montreal and Nuns' Island)	Increased traffic following construction of housing units (local network) Increased noise and dust levels during construction (Nuns' Island)
Repairs to the Mercier and Champlain bridges (JCCBI)	2008-2013	Increase in SS in the surface water	Disturbance of habitat used by peregrine falcon	Road congestion due to detours and partial closures (regional network) Increased noise levels during construction (Nuns' Island)
Road maintenance work (MTQ)	2008-+	Increase in SS in the surface water	-	Road congestion due to detours and partial closures (regional network)
Construction of a temporary causeway at Nuns' Island (JCCBI)	2013-2016	Mobilization of contaminants in the surface water Increase in SS in the surface water	Loss of habitat used by the brown snake (Island of Montreal and Nuns' Island)	Road congestion due to detours and partial closures (regional network) Increased noise levels during construction (Nuns' Island)
Operation of mass transit lanes on the New Bridge for the St. Lawrence (AMT)	2021- +	-	-	Intermodal shift of bridge traffic Depending on mode of transportation, increase in noise levels during operation.
Restoration of riprap over Louis-Hippolyte-La Fontaine Tunnel (MTQ)	2013-2015	Increase in SS in the surface water	-	-

Table 83 Analysis of cumulative effects – New Bridge for the St. Lawrence

VALUED ENVIRONMENTAL COMPONENT	RESIDUAL EFFECTS OF THE NBSL PROJECT	EFFECTS OF PAST, PRESENT AND FUTURE PROJECTS	CUMULATIVE EFFECT	ADDITIONAL MITIGATION MEASURES	ANALYSIS AND SIGNIFICANCE OF RESIDUAL CUMULATIVE EFFECT
Water quality	The work could cause an increase in SS in the River.	Mobilization of contaminants in the surface water Increase in SS in the surface water	Increased particle load in the River Mobilization of chemical contaminants in the surface water	A performance objective was established for water quality (25 mg/L) to reduce the flow into the river of suspended solids produced by the project. A reference state should be developed prior to the work in order to have a complete profile of the situation and adjust work methods accordingly.	All measures will be taken to maintain a sediment load within allowable levels during the work. Accordingly, the expected cumulative effects on the water quality component are felt to be non-significant once mitigation measures are considered. Follow-up of water quality will however be necessary to confirm the effectiveness of the measures.
Quality of life – Infrastructure, air quality and sound environment	Issue with congestion during the work (reduced lanes, partial) Change in noise levels and air quality near infrastructure during operations phase	Traffic increase Congestion in the event of works Increased number of noise sources Changes to air quality	Congestion on the South Shore road network and bridges Intermodal shift towards mass transit Increased noise levels in some sensitive areas Increase in dust concentration in the event of simultaneous works	The New Bridge for the St. Lawrence will include one lane in each direction dedicated to public transit to be determined by AMT. Transport Canada and the private partner should be involved in the various works coordination committees for the Montreal region. Transport Canada and AMT should work together to develop a mass transit option that meets noise standards.	When Highways 30 and 50 are open, there will be reduced pressure on the Montreal network, particularly for interregional transportation. Maintenance of mass transit capacity will also mitigate some of the congestion. Coordination of the various work sites and stakeholders will ensure that traffic flow is maintained and also that the work is staggered. Accordingly, the expected cumulative effects on the infrastructure, sound environment and water quality components are felt to be non-significant once mitigation measures are considered.
Special status species – Brown snake	Temporary habitat loss (Montreal and Nuns' Islands)	Habitat loss (specifically on Nuns' Island)	Reduced habitat for the brown snake on Nuns' Island	The promoter should incorporate accommodations for the brown snake into the footprint of the old Champlain Bridge.	The species is at the northern extremity of its North American range. The North American population is considered sizeable, although population groups are isolated and highly localized. COSEWIC feels that the species is not at risk in Canada. The main road projects will be implementing measures to ensure that the species is protected. Accordingly, the cumulative effects are felt to be non-significant once mitigation measures are considered.
Special status species – Peregrine falcon	Destruction of a potential nesting site on the existing bridge. Disruption of nesting on the existing bridge during construction.	Disruption of nesting for the species	Disruption of nesting during simultaneous work (new and existing bridges)	The measures identified in Table 70 are considered sufficient.	The various works could disrupt nesting for the peregrine falcon; however, the species is known to return to nesting sites annually even when nesting is disrupted. The Quebec population is growing, from 58 nesting pairs in 2005 to 98 in 2010. During the work, the falcon will be able to nest on structures nearby (Jacques Cartier Bridge, St. Joseph's Oratory, Université de Montréal). Accordingly, the cumulative effects are felt to be non-significant once mitigation measures are considered.

8.3 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The effects of the environment on the project are described as any negative effects that the environment could have on the project, such as weather conditions, seismicity and the potential effects of climate change. In particular, it is necessary to determine whether climate change has the potential to affect the project during its lifetime.

The environmental factors that may have an influence on the project are as follows:

- Extreme weather conditions (severe thunderstorms, violent winds, snowstorms, extreme cold, etc.);
- Changes in water levels in the river, both low and high;
- Earthquakes;
- The first two factors are conditions also associated with climate change.

Thus, if extreme weather conditions (severe thunderstorms, violent winds, snowstorms, extreme cold, etc.) or potentially dangerous natural phenomena are observed or anticipated, operations will be suspended temporarily and protective measures taken to ensure worker and user safety and prevent equipment and materials from falling into the river. The site office will need to maintain a monitoring system based on EC weather watches and warnings to follow these events.

The water levels near the New Bridge for the St. Lawrence are controlled by a number of dams upstream on the river itself and the Ottawa River. If exceptionally high water levels were anticipated, protective measures would also be taken to ensure the safety of people and the structures. The ice booms or other work structures will be designed to withstand five-year flood levels.

The new earthquake resistance standards will be incorporated into the design of the New Bridge for the St. Lawrence project.

Moreover, the above-mentioned factors and related standards will be taken into consideration when the plans and specifications for the structures of the New Bridge for the St. Lawrence are designed.

In short, the environment is unlikely to have any significant negative effects on the project if the planned mitigation measures are implemented.

8.4 IMPACTS ON NAVIGATION

The St. Lawrence Seaway is the only waterway for the transportation of goods between the St. Lawrence River and the Great Lakes. Commercial shipping in the Seaway therefore cannot be disrupted during construction of the New Bridge for the St. Lawrence or during deconstruction of the Champlain Bridge without an agreement between TC, SLSMC and the private partner, where applicable.

The SLSMC is the organization responsible for the safe and effective passage of maritime cargo between facilities on the Canadian seaway. As a result, it prohibits work within the boundaries of the St. Lawrence Seaway during the shipping season, which runs from March to December each year, unless it receives and approves a technical protocol for the work in advance. Discussions are underway between Transport Canada and SLSMC with respect to this technical protocol.

The technical protocol must outline the planned work methods and the measures that will be taken to ensure the commercial shipping remains uninterrupted and safe. The SLSMC reserves the right to approve or amend the protocol based on its criteria and objectives. For example, a technical protocol was put in place that allowed construction on the Beauharnois Bridge over the Seaway during the shipping season.

The ban on construction covers all bridge construction and demolition activities that take place within the jurisdiction of SLSMC and covers foundations, footings and piers, deck construction or removal and maintenance activities.

Furthermore, in order to set up a work area within the boundaries of the St. Lawrence Seaway and to build and maintain structures, Transport Canada will continue discussions with SLSMC to negotiate and sign a lease agreement. This applies to the embankment as well, as it falls within SLSMC jurisdiction and any activity or structure on the embankment must also be validated by the organization.

Two options are being considered for levelling the piers of the Champlain and Nuns' Island bridges: Complete removal of the piers to 30 cm below the river bed or cutting the piers to 2 m under the low water level. The environmental effects of these two options were briefly evaluated. The results are presented in the following table. These factors must be considered in the preliminary engineering for deconstruction of the current bridges.

Table 84 Comparison of environmental effects of options for removal of Champlain Bridge piers

COMPONENT	ENVIRONMENTAL EFFECTS	
	Levelling of piers	Cut 2 m below water level
Fish habitat	Potential gain of 5,200 m^2.	Some gain may be obtained on submerged surfaces.
Water quality	Limited disturbance in water quality. The measures identified above will be implemented.	Limited disturbance in water quality. The measures identified above will be implemented.
Navigation	No effect on navigation. Free passage is assured.	Obstacles possible in the event of a drop in the water level of the river. Nautical charts will need to be modified to signal these obstacles.
Ice regime	No effect on ice regime.	Depending on the thickness of the ice, there is a risk of ice jams, particularly in the Lesser La Prairie Basin. Modelling of the ice regime under these conditions will need to be done.

Transport Canada will need to issue approvals under the *Navigable Waters Protection Act* with respect to the plans for the structures to be built and the working methods that will be submitted. For the duration of the project's construction and deconstruction phases, special conditions will be issued to whoever will be building, installing or maintaining any structure whatsoever in, on, over, below or across these navigable waters. The public right to navigation and the safety of boaters will be maintained through temporary mitigation measures provided in these same approvals. Following completion of the work, the configuration of the new bridge will result in no additional disruption to navigation in the La Prairie Basin and the St. Lawrence Seaway.

Furthermore, under the *Navigable Waters Works Regulations* regarding equipment and debris, the Regulations state:

> No person shall permit any tools, equipment, vehicles, temporary structures or parts thereof used or maintained for the purpose of building or placing a work in a navigable water to remain in such water after the completion of the project.
>
> Where a work or a portion of a work that is being constructed or maintained in a navigable water causes debris or other material to accumulate on the bed or on the surface of such water, the owner of that work or portion of that work shall cause the debris or other material to be removed to the satisfaction of the Minister.

8.5 EFFECTS OF ACCIDENTAL SPILLS AND ENVIRONMENTAL EMERGENCY RESPONSE PLAN

Accidents that must be covered by an emergency response plan include spills of oil and other hazardous materials, the failure of anti-erosion and anti-sedimentation measures as well as collisions and fire on or below the structures.

All necessary precautions will be taken to avoid deficiencies and accidents during every phase of the project and to minimize the possible effects on the environment when accidents do happen. Accidents with the greatest potential to affect the environment include the following:

- Spills of hydrocarbons or other hazardous materials;
- Deficiencies in the erosion and sedimentation control measures;
- Collisions and fire on and beneath the structures.

It is difficult to accurately anticipate the nature and severity of such events. However, the probability of serious accidents or events causing significant negative environmental effects is low as a result of the emergency response and management plans that will be put in place.

8.5.1 Accidental spills

The presence and operation of machinery and means of transportation can affect quality of water and soil as a result of spillage of petroleum products or other hazardous materials. When work is going on, the measures that must be taken in order to minimize the risk of accidental spills include, but are not limited to, the following:

- Prepare secure hazardous material storage areas that comply with current regulations;
- Prohibit from the work site any moving equipment (e.g.: cranes, elevator, trucks, etc.) that leaks hydrocarbons (gas, engine oil or hydraulic oil);
- Plan for one or more machinery fuelling areas, which must be located more than 30 metres from any ditch, grate or sewer line and more than 60 metres from any watercourse;
- Supervise the refuelling of machines on site;
- Have on site emergency response materials and personnel required in the event of accidental spills;
- Develop, distribute and apply the actions and procedures to be implemented in the event of accidental spills.

If an accidental spill occurs, the leakage must be confined and the spilled product recovered and disposed of at an MDDEFP authorized site. To do this, the work site must at all times have sufficient petroleum product recovery materials available, including absorbent rolls that can be used on the entire width of the watercourse or that can confine petroleum products within the desired perimeter. During the critical phases of work in water, emergency environmental response teams will be pre-deployed for high-risk operations. Lastly, the sites must be restored. Further, in

the event of a sizeable spill, the federal and provincial environmental emergency departments, and the SLSMC, must be informed. Accordingly, their telephone numbers must be displayed in the site trailer.

8.5.2 Deficiency of anti-erosion and sedimentation measures

Deficiencies in the structures to prevent erosion and sedimentation may lead to discharge of a large quantity of effluent with heavy sediment loads into the receiving watercourse and have potentially harmful effects on fish and the fish habitat. Measures to counter erosion and sedimentation must be put in place to protect water quality. The measures must be supervised by an environmental inspector, particularly after heavy rains or during snowfalls that cause observable surface runoff. Weekly monitoring will also be conducted to ensure that these measures are effective. Preventive action must be taken whenever needed including replacing barriers and draining sedimentation basins.

8.5.3 Collisions and fire

A risk analysis is required to deal adequately with the effects of a collision or fire on or beneath the structures. The analysis would be based, among other things, on the type of vehicles and vessels travelling over the bridge and on the Seaway, as well as the type and quantity of products transported and frequency of transportation. Upon completion of the analysis, the steps to be taken can be planned and load calculations deduced depending on the risk deemed acceptable by Transport Canada and the private partner. The structures will be designed to meet these criteria.

Collisions

A collision can have a number of causes: human error, mechanical fault, weather conditions, mechanical and hydraulic conditions, and traffic and geometric conditions of the shipping channel.

For commercial shipping, the main effect of a ship collision under or on the bridge would be the impediment to shipping. Routine Seaway activities would be affected or even brought to a halt if a vessel collided with a bridge pier or if a serious traffic accident took place on the bridge. In the first case, the vessel involved in the collision could prevent other vessels from passing for an indeterminate amount of time. In the latter case, the debris falling from the bridge could endanger safety of vessels travelling beneath the bridge.

Furthermore, the main effect of a vessel striking a bridge pier would be deterioration of the bridge structure. Piers and foundations will be designed to address the criteria identified in the risk analysis. Deterioration of the structure will depend on the specific conditions of the structure, the geometry of the channel, the mass and clearance of the vessel, its collision speed and angle (head-on or sideways).

To reduce the negative impact of a collision, a number of measures can be planned:

- Training of vessel operators;
- Use of navigational tools;
- Regulation of shipping;
- Installation of structural protection systems.

Numerous structural protection systems are possible and their design and application must meet SLSMC standards and requirements. Such systems include pier protection systems and guardrails on the bridge.

Fire

Fires can start whenever spillage of petroleum products or chemicals occurs on or beneath the bridge.

For commercial shipping, the main impact of a fire on or beneath the bridge would be the impediment to navigation. Vessel traffic in the Seaway would have to be interrupted if a fire started either beneath or on the bridge so that rescue operations could take place and to guarantee user safety.

The main effect of a fire on the bridge structure would be alteration through effect of heat. In particular, a fire can cause deformation of the bridge deck. However, alteration of the structure would depend on the construction materials and the temperature of the fire. Installation of structural protection systems (i.e. surface materials) may delay the effects of a fire, though effectiveness of such systems would depend on the intensity of the fire.

To reduce the negative impact of a fire, a number of measures can be planned:

- Regulation of maritime and road traffic (speed limits, control of goods transported, etc.);
- Installation of structural protection systems (i.e. surface materials);
- Design of access routes for rescue operations.

8.5.4 Environmental emergency response plan

An environmental emergency response plan must be developed by the private partner in order to adequately manage any situation that presents a risk to the environment. The plan must be submitted for approval prior to the start of work and must take into account the methods, requirements and constraints of all the stakeholders (TC, DFO, EC, HC, CCG, JCCBI, SLSMC, MDDEFP, City of Montreal and City of Brossard).

The environmental emergency response plan must include the following;

- Appointment of a site supervisor/manager;
- A list of people, companies, organizations or any other authority to be contacted in the event of an emergency or spill, as well as a description of their respective roles and responsibilities;

- An organizational chart for communications;
- A list of situations presenting a risk to the environment and related preventive measures;
- The various actions and procedures to take place in the event of an emergency or spill;
- Training to be provided to stakeholders;
- Holding exercises if deemed necessary;
- Incident reports and corrective measures put in place.

The environmental emergency response plan will be incorporated into the project environmental management plan (see Section 9).

9 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan is designed to describe the minimum requirements that must be met by the private partner in order to minimize the effects that the structural design and construction activities may have on the environment. The plan includes the environmental monitoring program, the environmental follow-up program and the emergency response plan.

The private partner is required to develop an environmental management system (EMS), which will be based on the latest version of ISO 14001:2004 standard requirements (Canadian Standards Association, 2009).

EMS implementation has the following objectives:

- Project activities shall be carried out in accordance with the environmental and sustainable development policy that has been established for the project, in compliance with Transport Canada's specific requirements;
- Project activities shall comply with environmental legislation, third-party agreements, Transport Canada requirements and any other applicable requirements;
- Project activities shall meet the performance criteria and targets set out in the preceding stages of the process including this environmental assessment (Table 85);
- All programs, plans, procedures and documentation required for projection execution shall be provided;
- All planned procedures and mitigation measures (in particular those identified in this environment assessment) shall be followed and their implementation controlled in order to report on their effectiveness;
- Any non-compliance issues shall be identified and corrected and the required corrective and preventive action taken;
- A report on the effectiveness of the EMS shall be provided to ensure continuous improvement through the commitment of the private partner’s senior management to providing the resources necessary to achieve this.

The conditions for EMS implementation and ISO 14001 certification could be incorporated into the tenders and form an integral part of contracts. Further, it is strongly recommended that the EMS be integrated with the project's quality management and health and safety management systems. A verification and audit system will be established to ensure that the EMS meets these objectives.

The following sections identify the specific requirements to be incorporated into the EMS.

9.1 GENERAL REQUIREMENTS

The EMS must cover all of the project activities, i.e. activities identified in the design, construction and operations phases (follow-up on effectiveness of measures and corrective action where requirements are not met). Depending on the type of contract use, it is possible that a separate EMS will be required at each of the above phases.

9.2 PROJECT ENVIRONMENTAL POLICY

The project's environmental policy sets out the objectives to be met in terms of third-party requirements, continuous improvement, environmental compliance and connection to other policies.

The project's environmental policy must meet Transport Canada requirements. Further, the policy shall include guidelines for meeting three priorities in the federal sustainable development policy (EC, 2010):

- Addressing climate change and air quality;
- Maintaining water quality and availability;
- Protecting nature.

9.3 ENVIRONMENTAL ASPECTS AND SIGNIFICANT EFFECTS

The effects of the project on the environment will be identified. This item stems primarily from this environmental assessment and takes into account the amendments that will be made to the project during the design phases. The mitigation measures identified in Table 70 must be included.

The private partner is required to update the environmental aspects and effects grid (Table 70) regularly to tailor it to their activities and implement the necessary mitigation measures and any other measures they deem necessary so that the activities do not have significant residual effects.

9.4 LEGAL AND OTHER REQUIREMENTS

The requirements stemming from federal legislation, federal environmental policies and terms and conditions of the authorizations issued must be recorded in the environmental management plan, including the following:

- *Fisheries Act*, R.S.C. 1985, c. F-14;
- *Canadian Environmental Protection Act* (1999*)*; S.C. 1999, c.33;
- Former *Canadian Environmental Assessment* Act, S.C. 1992, c. 37;
- *Navigable Waters Protection Act;* R.S.C. 1985, c. N-22;
- *Species at Risk Act;* S.C. 2002, c.29;
- *Migratory Birds Convention Act*, 1994; S.C. 1994, c.22;
- *Canada Shipping Act, 2001*, S.C. 2001, c. 26;
- Federal Policy on Wetland Conservation.

9.5 ENVIRONMENTAL OBJECTIVES, TARGETS AND PROGRAMS

The means for achieving the objectives and targets must be identified, specifically implementation programs, designation of responsibilities and implementation calendar.

In establishing the policy, objectives and environmental targets, the private partner must take into account the objectives set by TC, which will be identified in the performance specifications.

9.6 RESOURCES, ROLES, RESPONSIBILITIES AND AUTHORITY

The various stakeholders must be identified according to the construction approach selected, for example, using an organization chart to illustrate the relationships between them. The environmental roles and responsibilities of the stakeholders must also be described, including the following:

- EMS coordination;
- Monitoring committee;
- EMS internal verifications (audit and review);
- EMS continuous improvement program implementation;
- Effective non-compliance management;
- EMS performance report preparation.

The private partner shall appoint individuals to take charge of the EMS. They must have the training, skills and authority necessary to assume the assigned responsibilities and ensure effective EMS implementation.

9.7 SKILLS, TRAINING, AWARENESS AND COMMUNICATION

The Environmental Management Plan must identify procedures for training the people who will perform tasks that may have an impact on the environment and for internal and external communications. The tools to be put in place to do this and the minimum skill requirements must be defined.

9.8 DOCUMENTS

EMS documentation must include the following:

- Environmental and sustainable development policy as described above in section 9.2;
- EMS manual containing all the guidelines and procedures relating to the environment;
- Environmental management plans described in section 9.6;
- Environmental monitoring programs described in section 9.8;
- Any other relevant document required by TC.

In the interests of transparency and to keep citizens informed, all documents will be available on the project website. Certain elements of a contractual and confidential nature will not be accessible.

9.9 DOCUMENT CONTROL

A secure computer system for sharing information between the private partner and Transport Canada is recommended to provide Transport Canada with access at all times to all project documentation.

9.10 ENVIRONMENTAL MANAGEMENT PLANS (OPERATIONAL CONTROL)

The private partner must establish and implement environmental management plans, approved by the relevant authorities, in order to minimize effect on the environment and social impacts of the project activities. The private partner must develop and document the following plans, at a minimum:

- Review of environmental requirements during the design phase;
- Pollution prevention;
  - Noise levels (noise management plan);
  - Air quality;
  - Water quality;
  - Drinking water intakes;
- Storage and use of petroleum products, hazardous materials and hazardous waste, vehicle maintenance and parking;
- Excavated material management (including contaminated soil and sediments);
- Deconstruction material, residual matter and hazardous waste management;
- Approval of fill materials;
- Runoff management and erosion protection;
- Protection of flora and fauna.

The plans must include the following:

- Activities identified in the plan and effects that could results from them;
- Legal and other applicable requirements;
- Stakeholder roles and responsibilities;
- Preventive measures to be implemented;
- Mitigation measures to be implemented;
- Methods of verifying, controlling and measuring achievement of target performance and documentation of results;
- Actions to be taken in the event of non-compliance.

9.11 EMERGENCY RESPONSE PLAN

The details of the emergency response plan, as presented in section 8.5.4, will be integrated into the EMS. Comprehensive procedures will also be prepared based on the working methods chosen.

9.12 ENVIRONMENTAL MONITORING

Environmental monitoring is a series of measures designed to provide supervision of the implementation of mitigation measures identified during the screening process as well as the contractual mitigation measures and those identified by the private partner. Under subsection 20(2) of the CEAA, the responsible authorities (TC, Fisheries and Oceans Canada and Environment Canada in this instance) are responsible for supervising implementation of mitigation measures. Environmental monitoring is also part of the EMS.

During the work, a site supervisor will be responsible for ensuring that all environmental measures are followed. The site supervisor will have administrative documents, including all applicable authorizations and permits, available for that purpose. The supervisor must also ensure that the measures are effective and, where warranted, inform Transport Canada and ensure that alternate protection measures are proposed.

The site supervisor is required to complete a monitoring report to ensure that mitigation measures are respected as the work progresses. The site supervisor is also required to submit a monthly monitoring report to the responsible authorities. The report will enable the site supervisor to ensure that mitigation measures are applied, take note of any issues or problems and see to their correction. Photographs must be taken by the supervisor to document observations on the ground.

Certain mitigation measures have been formulated as performance criteria. In these cases, the private partner will be responsible for implementing the appropriate measures to ensure compliance. Specific monitoring of these elements is therefore required. Table 85 provides a brief description of the requirements for performance criteria monitoring identified in the effects analysis. The main monitoring criteria are presented in the next section.

Table 85 Prescribed approaches for monitoring performance criteria

COMPONENT	INDICATOR	THRESHOLD	SECTORS AT RISK	METHODOLOGY	FREQUENCY	PROCEDURE TO ADDRESS NON-COMPLIANCE
Air	Fine particles PM2.5 Total particulate matter	30 µg/m³ 24-hr. average 150 µg/m³ 24 hours	Residential areas fewer than 50 m from the work.	Method: 8.06/1.3/M (EC, 2009a) Sampling upstream and downstream of the work.	Every two weeks during the work between April and October. Reduce frequency if indicator is below threshold for four consecutive samples.	Additional mitigation measures and reduction at source. Examples: Cover piles of materials; Use of dust control products; Restriction during high winds.
Water quality	SS	25 mg/l or 25 mg/l above upstream value	St. Lawrence River (Nuns' Island channel, Greater and Lesser La Prairie basins) upstream and downstream of work site.	Continuous sampling station for turbidity and correlation of SS and turbidity.	Continuously during work in the water.	Additional mitigation measures and reduction at source. Example: Turbidity curtain
	Contaminants	Criteria for release into natural environment	Sectors in which contaminated soils are found (Island of Montreal).	CEAEQ surface water sampling method. Basin water sampling.	When purging settling ponds.	The contaminated water must be treated or disposed of at an authorized site.
Sound environment	L_{10}	Daytime: 75 dBA or ambient noise during non-work Evening and nighttime: ambient noise during non-work plus 5 dBA	Sensitive areas identified on figures 80, 81 and 82 of Part I (in Appendix 4).	Method: FHWA-PD-96-046	Daily for work estimated at greater than 70 dBA near sensitive areas.	Additional mitigation measures and reduction at source. Examples: Sound suppressor or enclosures; Electrical air supply compressors; Soundproof hydraulic drills; Soundproof concrete saw blades; Temporary noise barriers (portable or fixed).
Hydraulic	Flow velocity (m/s)	Values measured before work in sensitive areas.	Lesser La Prairie Basin Nuns' Island channel	Measurement of flow velocity using a current-meter.	Once before installation of infrastructures that may change flow velocity. Once after installation of infrastructures.	Modification of infrastructures to maintain target velocities, such as adding a culvert to a jetty.

9.12.1 Monitoring of noise levels

The sound environment has been identified by the public as an issue of concern. The noise produced by a construction site can be bothersome to neighbouring residents. To limit the inconvenience as much as possible, a noise management program must be included in the project proposal in the form of special specifications. The noise management program is designed to commit the selected private partner, as well as all subcontractors and suppliers, to minimize the impact of noise levels of the work on site on residents living nearby.

This section outlines the guiding principles of the noise management program during construction, since at this stage of the project it is not possible to precisely estimate the impact of noise. Effectively, even though it may be possible to identify work methods and equipment ahead of time, these characteristics of the project vary from one contractor to the next.

As such, the noise management program during construction will include but is not limited to the following requirements:

- The private partner is required to bring in a firm specializing in acoustics with at least two years of experience in noise management on construction sites to provide technical assistance on the work site;
- The noise management program shall include a detailed noise control program for the work in order to anticipate noise issues for the various work phases and to identify appropriate mitigation measures. This report will be conveyed to the relevant authorities and to Transport Canada before work begins;
- The program shall also include an acoustic monitoring program involving supervision of perceived noise levels in the sensitive areas and an inventory of the sound environment created by the work site. The monitoring will make it possible to comply with authorized noise levels and ensure that the mitigation measures taken, or those identified in the detailed program, are effective;
- The detailed program must identify maximum authorized noise levels for the various noise-sensitive areas near the work site and for each period of the day during which work will be done, according to the following criteria:

Table 86 Authorized noise levels

PERIOD	NOISE LEVEL L_{10}* IN DBA
7:00 a.m. to 7:00 p.m. (daytime)	75 dBA or ambient level during non-work** plus 5 dBA, if greater than 75 dBA
7:00 p.m. to 10:00 p.m. (evening)	Ambient level during non-work** plus 5 dBA
10:00 p.m. to 7:00 a.m. (nighttime)	Ambient level during non-work** plus 5 dBA

* L_{10} means that for 10% of the sample time, the sound levels exceed the specified threshold. The sample time is 30 minutes.

** Ambient level during non-work, represented by Leq (equivalent level), is the noise level measured over a minimum period of 24 hours ($Leq_{24\text{-hr.}}$) at least twice, for two non-consecutive days period to the start of construction work. The ambient noise must be measured in the daytime (7:00 a.m. to 7:00 p.m.), evening (7:00 p.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.).

- Basic training must be provided prior to start of work to the site stakeholders (superintendant and foreman) by the professionals with the firm specializing in acoustics regarding noise management issues. The course must raise awareness, give guidance and direction to the stakeholders in use of equipment and methods of reducing noise that apply to work sites;
- The detailed noise control program and the acoustic monitoring program must describe the noise-sensitive areas most likely to be affected by work site noise.

The detailed noise control program shall also include, but is not limited to, the following:

- Presentation of qualified noise management personnel;
- Description of the work zone, including location of noise-sensitive areas affected and ambient noise measurement points;
- Results of 24-hour noise surveys taken prior to the start of work;
- General description of the various work phases planned for the project and their locations;
- Type and number of pieces of equipment and planned level of use during the various phases;
- Technical data sheets on the equipment used as well as their noise emission levels;
- Estimated noise levels produced for the various phases in the sensitive areas, in the form of tables and figures, as well as expected duration of noise impact;
- Identification of mitigation measures necessary to comply with maximum authorized noise levels, including assessment of their effectiveness, procedure put in place and a cost estimate;
- Plans for mitigation measures (walls or enclosures), where required, signed and sealed by an engineer certified by the Quebec Order of Engineers (OIQ);
- The various components must be approved by the site supervisor.

The acoustic monitoring program must also include, but is not limited to, the following for the various construction phases (or where necessary):

- Location of main measurement points to be considered for monitoring;
- Maximum authorized noise levels at each measurement point;
- Type of measuring instrument used for noise surveys;
- Methodology and estimated time for measurements;
- Results of noise surveys taken near equipment used on site to corroborate the noise emission levels specified in the technical data sheets;
- Procedures for addressing violations of maximum authorized noise levels in order to avoid stoppage of problematic work;
- Procedure for addressing complaints;
- The various components must be approved by the site supervisor.

The various surveys must comply with the following guidelines in particular:

- Measurement instruments must be integrated sound level meters meeting class 1 sound level meter requirements, as described in ANSI 5.1.4 – 1983 (R 1990) standard "Specification for Sound Level Meters";
- The measurement methods and conditions will be in compliance with those specified in the FHWA document "Measurement of Highway-Related Noise," May 1996 (FHWA-PD-96-046), as well as a type 1 calibrator;
- Noise levels must be taken five metres away from the building requiring protection (dwelling) or at the property boundary if the building is located fewer than five metres from the work. The sound level meter microphone must be 1.5 metres above the ground;
- The noise surveys will be carried out in the sensitive areas identified in Figures 80, 81 and 82 of Part I of the Environmental Assessment Report (in Appendix 4);
- Noise surveys may not be taken when it is raining or where snow has accumulated on the ground. The roadway must be dry and wind cannot be in excess of 20 km/hr. The temperature must be between -10 and 50°C and relative humidity between 5% and 90%;
- For the noise surveys taken 24 hours before the start of work, the measurements to be taken will be equivalent level (Leq) and statistical levels ($L_{1\%}$, $L_{10\%}$, $L_{50\%}$, $L_{90\%}$), for each one-hour period, all in dBA.

In the event the authorized sound level criteria are exceeded, additional measures must be put in place. The path for implementation of the mitigation measures will be as follows:

- Noise surveys at sensitive points;
- Assessment and recommendations regarding required mitigation measures;
- Application of mitigation measures;
- Noise surveys at sensitive points.

As an example, additional measures may include a modification of the work method or schedule, replacement of the noisy equipment or installation of noise-suppression devices.

9.12.2 Monitoring of surface water quality during the construction phase

The private partner will prepare a program for monitoring surface water quality during the construction phase. The purpose of the program will be to monitor erosion and suspended solids by measuring turbidity, pH levels and SS. Metals and oils/grease may also be analysed to determine whether the work is increasing the mobilization of contaminants in surface water. The program will also make it possible to verify the effectiveness of the mitigation measures implemented.

The performance objective (25 mg/L) will be monitored and measured via a network of sampling stations located upstream and downstream of the sites to determine the degree to which the site is impacting the river’s natural concentration of suspended solids. The number of stations in the network,

the distance between the stations, their exact location and the frequency of readings will be determined based on the work site's parameters, such as river flow and environmental sensitivity. During the work, water quality will be measured several times a day using an *in situ* method calibrated by laboratory measurements. Monitoring will be done on an ongoing basis in the areas where work is to be done and in open water (sampling will not be done when ice is present). The final monitoring protocol will be developed during preparation of the final plans and specifications.

For example, the surface water quality monitoring plan prepared by the private partner should show that surface water quality is maintained at all times, at a distance of 50 m from the emission site, at 1/3 and 2/3 of the water column (this criteria will have to be established based on the hydrodynamics of the modelling). The stations could comprise stationary or mobile equipment or installations that provide continuous readings, at 1, 2 or 3 depths, every four hours.

Where the threshold is exceeded, an alarm system will be triggered so that the appropriate corrective action can be taken quickly.

The monitoring program methodology must meet the following criteria:

- The equipment required for pH and turbidity parameters;
- During the construction phase, monitoring will begin in the spring and stop in late fall;
- Turbidity sampling will be done on an ongoing basis.

The volume of SS is determined using a correlation with the results of the turbidity measurement. If the turbidity or SS levels are high, the following actions must be taken as long as the measured value is in the at risk range:

- Validate the corrective action to be taken at the site to normalize the situation;
- Monitor the recommended corrective action.

Validate the SS results by taking into account the results of the particulate count.

9.12.3 Monitoring of air quality during the construction phase

The private partner will prepare a program for monitoring air quality during the construction phase. The purpose of the program will be to monitor fine and total particulate matter ($P_{2.5}$ and P_{tot}) against the air quality performance criteria. The program will also make it possible to verify the effectiveness of the mitigation measures implemented.

The program will be implemented during dust-generating activities, including excavation, earthworks, grading and deconstruction. A reading for each indicator ($P_{2.5}$ and P_{tot}) must be taken over a period of 24 consecutive hours downstream and upstream of work when that work is in the vicinity of sensitive areas. The location of sampling stations will be adapted based on prevailing winds and work areas at the time. Monitoring will be conducted every two weeks from April to October in the areas where work has taken place.

If the sampling period has to be shortened, the results will be reported on a 24-hour basis, using industry standards (Leduc, 2004)

The sensitive areas are defined as those areas in the footprint where residences are within 50 m (for this project, noise-sensitive areas are the same as the areas for air quality. See Figures 80 to 82 of Part I of the Environmental Assessment Report and Figure 84 of this report).

Sampling methodology must meet the following criteria:

- The equipment will comprise four high-volume sampling stations with specific heads for each parameter ($P_{2.5}$ and P_{tot}) located downstream and upstream of the work;
- The equipment must be calibrated;
- The stations must be operated simultaneously to obtain concentrations for both parameters under the same operating conditions;
- The stations must be placed near the edges of the footprint and the residential area at the highest-risk location depending on the operations and wind direction;
- Sampling must be planned in accordance with weather conditions in order to assess the risk of fine particulate emission;
- Once sampling is completed, the filters must be pre-weighed and then sent to an accredited laboratory to obtain the total volume of the particulate matter sampled.

The consolidation of the results obtained will enable monitoring of changes in the following performance objectives:

- Total particulate matter (P_{tot}) = 120 µg/m^3
- Fine particulate matter ($P_{2.5}$) 30 µg/m^3

If the results obtained exceed one of these indicators, samples will have to be taken again over a 24-hour period as quickly as possible once the results are received. If the re-sampling results exceed either of the indicators corrective action will be taken to bring them within the performance objectives.

9.12.4 Monitoring of excavated and borrow material

Monitoring of the quality of excavated soil and sediment will be required to comply with contaminated soil and sediment management requirements. Excavated soil will be characterized and classified based on its level of contamination before final disposition is determined. The normal parameters (petroleum hydrocarbons, PAH, metals, PCBs) will be analyzed for each batch of excavated material.

The following criteria will be used to determine how the material is to be managed (Table 87). The primary objective will be to reuse at the site the maximum volume of excavated material. Surplus material that cannot be reused will be disposed of at a site authorized to accept it.

Table 87 Restrictions on the use of excavated material

CCME SOIL QUALITY RECOMMENDATIONS	RESTRICTIONS ON USE OF EXCAVATED MATERIAL AT THE SITE
Agricultural/Residential (A-B)[1]	Unrestricted use.
Commercial/Industrial (B-C)	No contact with aquatic environment or within a 20 m riparian strip. Covered with a waterproof surface (bitumen, concrete) or a layer of soil in the A-B range.
Above C (Industrial)	Not to be used as fill. Treatment or disposal at an authorized site.

[1] MDDEFP generic criteria are shown in parentheses.

A similar approach will be used for borrow material, which must be sampled to ensure that it is contamination-free. Materials in contact with the aquatic environment must also be free of fine particulate matter to protect the aquatic environment.

9.12.5 Monitoring of fish habitat during work

Although it is difficult at this time to predict what type of monitoring may be required, monitoring will probably be necessary. The nature, scope and objectives of monitoring will be specified by DFO in the approval phase, once the plans and specifications and the various hydraulic studies have been completed.

9.13 ENVIRONMENTAL FOLLOW-UP PROGRAMS

The environmental follow-up program provides an approach for monitoring the development of certain components affected by the project and determine the accuracy of the forecasts and the environmental issues identified. It also makes it possible to verify effectiveness of the mitigation measures identified in the environmental assessment for which uncertainty may remain over the short, medium and long terms. The components that must be followed up on under the CEAA are as follows:

- Sound environment during the operations phase;
- Air quality during the operations phase;
- Compensation program for fish habitat and wetlands;
- Relocation of brown snakes;
- Peregrine falcon nesting;
- Vegetation recovery.

Aside from the noise monitoring program, the specifics of each follow-up program must be developed once the project details have been identified at the plans and specifications phase.

9.13.1 Noise monitoring program

The private partner will develop a proposed program for sound environment follow-up during operations, which will be designed to verify results identified in the noise impact study. The noise monitoring program will also make it possible to verify effectiveness of mitigation measures, where applicable.

The program will be implemented before construction begins (baseline case) and one, five and 10 years after the project goes into operation and will include the following:

- A noise survey for 24 consecutive hours will be taken at the first dwelling for every sensitive area (see figures 80, 81 and 82 of Part I of the Environmental Assessment Report and Figure 84 of this report). The noise survey may be completed simultaneously with the one-hour noise surveys for areas deemed to be too large. The one-hour noise surveys will be taken between 9:00 a.m. and 3:00 p.m.;
- Traffic counts will be taken for periods of six consecutive hours (9:00 a.m. to 3:00 p.m.) or for 24 hours. Counts must include the following categories of vehicles, at a minimum: cars, two-axle trucks, trucks with three axles or more. The purpose of the counts is to validate the sound environment computer prediction models and to assess average summer daily traffic (ASDT) on the road infrastructure if the information is not otherwise available;
- The effectiveness of the noise mitigation measures will be assessed on the ground and residual noise levels will also be confirmed using noise surveys.

The methodology for carrying out the various noise surveys will be based on the method identified in the MTQ document entitled "*Étude de pollution sonore pour infrastructures routières existantes – Méthodologie,*" (1989) and the U.S. Department of Transportation's methodology (1996). The surveys must be in compliance with the following, in particular:

- The measurement instruments must be integrated sound level meters meeting class 1 or 2 sound level meter requirements, as described in ANSI S1.4-1983 (R1990) standard "Specification for Sound Level Meters";
- Surveys are to be taken from Monday to Friday inclusively;
- The sound level meter microphone must be 1.5 metres above the ground and at least 3.5 metres away from walls, buildings and any other surface that reflects sound, where possible;
- Noise surveys may not be taken when it is raining or where snow has accumulated on the ground. The roadway must be dry and wind cannot be in excess of 20 km/hr. The temperature must be between -10 and 50°C and relative humidity between 5% and 90%;
- The measurements to be taken will be equivalent level (Leq) and statistical levels ($L_{1\%}$, $L_{10\%}$, $L_{50\%}$, $L_{90\%}$), for each one-hour period, all in dBA.

The computer model used for the noise impact study will be updated and revalidated using the results of the noise surveys during simultaneous follow-up and counts. This model will make it possible to

ensure that the noise generated by the project during the operations phase complies with requested objectives. A follow-up report must be prepared at the end of the three-month expiry of each of the above deadlines following the start of the project operations phase. The reports must include the following at a minimum:

- Summary of the results from the noise surveys;
- Summary of the various traffic counts;
- Sampling locations map;
- Records compiling all inventory data from the noise surveys;
- Comparison of results of follow-up noise surveys with those taken prior to the project (baseline case) at the same locations to validate or invalidate the assessment of anticipated noise impacts and the effectiveness of the mitigation measure;
- The results of the noise surveys representing the situation prior to the project will be supplied and shall come from the noise survey campaign taken prior to the work during the noise management program during the construction phase.

For the follow-up to take place 10 years following start of operations, mitigation measures will be proposed in the event that the expected sound environment estimates are violated in order to rectify the situation.

9.13.2 Air quality follow-up program

The private partner will implement an air quality follow-up program during the operations phase. The purpose of the program will be to monitor fine and total particulate matter ($P_{2.5}$ and P_{tot}) and other atmospheric pollutants.

The program will be carried out one; five and 10 years after project operations begin. The installation of a complete sampling station on Nuns' Island combined with measurements taken using mobile stations will provide a portrait of the air quality situation.

The methodology is similar to the monitoring program conducted during the work phases and must meet the following criteria:

- The equipment will comprise four high-volume sampling stations with specific heads for each parameter ($P_{2.5}$ and P_{tot}). Equipment designed specifically for sampling atmospheric pollutants will also be used;
- The equipment must be calibrated;
- The stations must be placed near the edges of the footprint and the residential area at the highest-risk location depending on the operations and wind direction;
- Sampling must be planned in accordance with weather conditions in order to assess the risk of fine particulate emission;

- Once sampling is completed, the filters for the fine and total particulate matter must be pre-weighed and then sent to an accredited laboratory to obtain the total volume of the particulate matter sampled;
- Air quality sampling will be conducted simultaneously with the traffic counts using the same method suggested for the sound environment follow-up program.

The results will be consolidated to monitor changes against Canadian ambient air quality recommendations and CMM criteria.

9.13.3 Follow-up on habitat compensation

Fish habitat and wetlands compensation is generally monitored over a five-year period. The purpose of the follow-up program will be to determine the degree to which the compensation plan objectives have been achieved (e.g., development of spawning grounds, survival of wetlands). Field measurements and visual inspections are required for monitoring.

The terms for fish habitat compensation follow-up will be detailed in the compensation program. Monitoring criteria and their duration and scope depend on the type of project, chance of success, risk associated with the stability of the developments and the scope of the development project or projects. All of this information will be specified once DFO finalizes the compensation program, which will be included in the authorizations to be issued by DFO pursuant to the *Fisheries Act*.

9.13.4 Follow-up on brown snake relocation

Brown snake relocation will be monitored twice-yearly over a four-year period to confirm that the snakes have adapted to their new habitat.

9.13.5 Follow-up on peregrine falcon nesting

Peregrine falcon nesting on the New Bridge for the St. Lawrence structure will be monitored. The use of artificial nesting boxes or any other bridge structure will be studied for a period of five years once work is completed (i.e., after deconstruction of the existing Champlain Bridge).

9.13.6 Follow-up on vegetation recovery

Vegetation planted once work has been completed will be monitored in the spring after planting and 24 months later to ensure that the plants have survived. The plant survival rate will be assessed via visual inspection, and new plants must be planted if the survival rate falls below 90%.

9.14 COMPLIANCE ASSESSMENT AND COMMUNICATION

In line with the compliance commitment, it is critical that the environmental management plan include an approach for periodically assessing and documenting compliance with the applicable legal requirements. Therefore, verification of legal compliance and compliance with other requirements,

including the EMS, must be done annually by a representative of the private partner (or a subcontractor).

The private partner shall submit a statement certifying legal and contractual compliance of the activities performed for the previous period. Attached to the statement must be a list of non-compliances arising during the period and the current status of each. The statement should be signed by the private partner's representative designated as the highest authority for the project.

9.15 NON-CONFORMITIES AND CORRECTIVE AND PREVENTIVE ACTIONS

A system must be established to address non-compliance issues and initiative corrective and preventive actions.

Non-compliance issues must be recorded in a log, which shall include, among other things, the tracking number of the non-compliance, the date, time and place of detection, the description of the non-compliance, the person who detected it, description, date and time of the corrective action taken, results of the follow-up on the effectiveness of the corrective action, photographic references and current status of the non-compliance issue. The log shall be submitted to Transport Canada on a weekly basis. Non-conformities will be discussed at site meetings.

A corrective and preventive actions process must be established in compliance with the ISO 14001 standard. A log of actions must be maintained and submitted to TC.

9.16 INTERNAL AUDIT

The private partner must plan an internal audit process on a regular basis. The audits will cover the entire EMS and are aimed at assessing and improving its effectiveness, in particular by identifying non-conformities and implementing corrective action. Follow-up audits should be planned to ensure effectiveness of corrective measures taken as a result of non-compliances identified. The schedule of internal audits and updates must be submitted to TC.

9.17 MANAGEMENT REVIEW

The private partner must carry out a minimum of one management review per year to review the objectives achieved by the EMS, the appropriate implementation of corrective action and the internal audit report. The management review will include the environment director, project lead, quality director and health and safety director. The management review report shall be submitted to Transport Canada according to a timeframe set by it.

10 ADDITIONAL ENVIRONMENTAL STUDIES

The environmental assessment identified environmental effects and the resulting mitigation measures. In some cases, the effects cannot be quantified with precision owing to a lack of data and the stage of the project. Once project design has reached a more advanced stage, additional studies will make it possible to pinpoint the effects and proposed mitigation measures. The following additional environmental studies were identified in this environmental assessment, and must be done before work begins:

- Establishment of the benchmark in the study area to provide a final and accurate portrait of the following components before work begins:
  - Surface water;
  - Ground water;
  - Air (sampling over a 12-month period at a minimum);
  - Soil characterization.
- Modelling, taking the project's configuration into account, to provide an accurate assessment of the effects on the following components:
  - Dispersion of contaminants and GHG emissions;
  - Noise;
  - Flow and ice regime near temporary works and piers.
- Bird mortality study if a cable-stayed structure is used.

Other studies may be required as the project develops.

11 SUMMARY OF EFFECTS

This section presents a summary of effects for each component. The sensitive areas are identified for each component (see Figure 84 for their location), and the effects and mitigation measures are described. Each sub-section contains a description of the performance objectives and the method to be used to monitor them.

11.1 Soil, sediment and groundwater

Sensitive areas

The following areas are deemed sensitive for soil, sediment and groundwater:

- Sud-Ouest Business Park (contaminated soil, sediment and groundwater);
- Lesser La Prairie Basin (contaminated sediment);
- Brossard wetlands (soil).

Description of the effect and context

Soil, sediment and groundwater will be affected by the presence of contamination, potential erosion and risks of spills during the construction and operations phases of the project.

In the pre-construction, construction, post-construction and operations phases, soil, sediment and groundwater will be affected by the following activities:

- Site mobilization and construction of temporary facilities;
- Relocation and protection of public utility infrastructures;
- Soil stripping and land clearing;
- Excavation, earthworks;
- Work in aquatic environments (construction and post-construction);
- Management of waste and hazardous materials (all phases);
- Transportation, operation and maintenance of machinery (all phases);
- Infrastructure maintenance and repair.

The inventory of the environment identified areas in which soil and groundwater are contaminated, mainly in the Sud-Ouest Business Park. Work in these areas has the potential to remobilize contaminants and affect uncontaminated soil and groundwater, and create a health hazard. The exposure of surfaces and berms will increase erosion caused by wind and rain. Accidental oil leaks from equipment could also contaminate soil and groundwater, as can the presence of lead or other contaminants during deconstruction.

Work in water could lead to remobilization of contaminated sediment, mainly in the Sud-Ouest Business Park and Lesser La Prairie Basin sectors (see section 11.2).

Finally, the use of road salt during the operations phase could result in chloride contamination of soil near infrastructures.

Mitigation measures

Before work

Because the exact quality of the soil is not known at this stage, the level of soil contamination must be characterized once the areas to be excavated are defined. A program for managing contaminated soil and excavated material must be developed at the preliminary engineering and specification preparation stage to ensure that the contaminated soil is treated or disposed of in accordance with current regulations.

Materials must also be characterized when the deconstruction plans and specifications are being developed, to identify and quantify the sectors containing asbestos and lead, and additional measures may then have to be defined.

During work

Mitigation measures will be implemented when work begins to limit the dispersion of contaminated soil and reduce erosion, including the following:

- Isolate and preserve the organic soil layer so that it may be reused in places where the topsoil has been stripped;
- Dispose of excavated material at a site designated for that purpose;
- Stabilize exposed areas susceptible to erosion (using a geotextile membrane, straw or seeding);
- Construct piers in confined and dewatered environments (e.g., using cofferdams);
- Immediately remove excavated sediment whose contaminant concentration is known to an approved site;
- Excavated sediment that cannot be removed must be immediately placed for temporary storage on a waterproof surface and covered for protection from the elements (e.g., sediment from uncharacterized piers);
- Keep the site free of waste at all times including empty containers of any kind unless they are stored in a sealed repository designed for this purpose;
- When contamination levels exceed criterion B of the Quebec Soil Protection and Contaminated Sites Rehabilitation Policy, all trucks leaving the worksite must pass through a vehicle wheel-washing facility;
- Store and dispose of contaminated soil and sediment at authorized sites and comply with the related federal and provincial requirements;

- Maintain transportation vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants;
- Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log;
- The private partner must plan construction on the Island of Montreal in collaboration with the operator of the containment system for the Western sector of the Sud-Ouest Business Park;
- An emergency kit for hydrocarbon spills must be available on the equipment at all times;
- In the event of a spill on land, the emergency response plan will be implemented. This plan includes:
  - Prompt notification of Environment Canada (1-866-283-2333) MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response team;
  - Elimination of the source of the spill;
  - Implementation of environmental protection measures (absorbent material);
  - Clean up of the affected area;
  - Disposal of contaminated soil.

During the operations phase

Some design criteria may be considered at the preliminary engineering phase to mitigate the effects of road salt used during the project:

- Meltwater will not be discharged directly into sensitive areas such as wetlands (see Figure 84) and a method for treating meltwater will be studied;
- The geometry of the structures must limit the accumulation of snow and ice on the infrastructures.

A road salt management plan must be developed to mitigate the environmental effects of road salt while maintaining road safety. The plan will be based on the Code of Practice for the Environmental Management of Road Salts (2004). There are no Canadian recommendations on chloride content in soil.

Performance objective

No performance objective for soil and sediments was established. Contaminated soil management will comply with CCME recommendations (1999a).

Performance monitoring

Although no objective has been established, soil and sediment quality monitoring will be required to comply with requirements for the management of contaminated soil and sediment. Excavated soil will be characterized and classified based on level of contamination before it is taken off the project footprint. Depending on the level of contamination, the soil may be:

- Reused on the site as fill material;
- Sent to a landfill site as fill;
- Treated and/or disposed of at an authorized site.

Groundwater must also be monitored to ensure that it is not contaminated as a result of the project. Sampling upstream and downstream of the work sites on the Island of Montreal will be carried out on a regular basis.

11.2 Surface water quality and hydrology

Sensitive areas

The following areas are deemed sensitive with respect to surface water quality and hydrology:

- St. Lawrence River (suspended solids and other contaminants);
- Aqueduct Canal (drinking water source).

Description of the effect and context

During the work and operations phases of the project, water quality will be affected by the introduction of suspended solids (potentially including contaminants), petroleum hydrocarbons and de-icing salts into the receiving environment.

During the pre-construction, construction, post-construction and operations phases, water quality will be affected by the following activities:

- Site mobilization and construction of temporary facilities;
- Soil stripping and land clearing;
- Excavation, earthworks;
- Work in aquatic environments (construction and post-construction);
- Management of waste and hazardous materials (all phases);
- Transportation, operation and maintenance of machinery (all phases);
- Deconstruction of existing bridges;
- Infrastructure maintenance and repair.

Work carried out in water, including the construction of temporary facilities and bridge piers, could result in resuspension of sediment in the river. Work on the riverbank, owing to its nature, could produce soil particles in surface water through runoff or excavation de-watering. Accidental petroleum hydrocarbon spills could also contaminate surface water. Resuspension of contaminants is possible, given that some sectors where work will be done are currently contaminated.

Finally, the use of road salt during the operations phase could result in negligible chlorine contamination in the river.

The risk of drinking water intake contamination was considered. The Aqueduct Canal is the City of Montreal's primary source of drinking water and must be protected from any contamination during work. Protective measures are required. The water intake for the Le Royer plant is located in the main channel of the river upstream from Notre Dame Island over 2 km from the study area. Because of the

implementation of mitigation measures, the river's ability to purify itself, the flow of the channel and the low concentration of contaminated sediments in the sector (Greater La Prairie Basin), no effect on the intake is expected.

Mitigation measures

Before work

Flow and ice regime modelling must be conducted following preliminary engineering to predict potential effects of the project on these elements. Additional measurements may then be required.

During work

Mitigation measures will be implemented when work begins to prevent the introduction of suspended solids and contaminants to surface water, including the following:

- Take all necessary precautions to prevent the migration of fine particulate matter to the aquatic environment above the immediate work area, using proven work methods (block or sheet pile cofferdams);
- Encourage the use of turbidity curtains to prevent sediment transport in the water;
- Stabilize exposed areas susceptible to erosion (using a geotextile membrane, straw or seeding);
- Divert drainage ditches towards stable vegetated areas, located more than 20 m from the natural high water mark. If it is impossible to divert the ditch, potential sediment loading from the structures must be controlled by means of a suitable and effective system to prevent leaching;
- Install settling and runoff capture ponds along work areas to prevent erosion and migration of fine sediment to the river or Aqueduct Canal (for work on the A15);
- Pump water out of excavations and discharge it in compliance with applicable federal, provincial and municipal regulations or call a specialized firm for pumping and final disposal;
- Prohibit access to the site to any mobile equipment that leaks oil. Keep a vehicle maintenance log;
- Use vegetable oil in equipment that will be used to work near water for a long period of time;
- Keep equipment at least 60 m from the river when not in use or when the site is closed;
- Maintain transportation vehicles and construction equipment in good working order to prevent leaks of oil, fuel or other pollutants;
- Prohibit access to the site to any mobile equipment that leaks oil;
- An emergency kit for hydrocarbon spills must be available on the equipment at all times. Kits must be available on the site at all times to deal with larger spills in aquatic environments;
- To prevent any risk of contaminant leaching, bituminous concrete (asphalt) must not be used as fill material in an aquatic environment because it is a potential source of hydrocarbons;
- In the event of a spill in an aquatic environment, the emergency response plan will be implemented. This plan includes:

- Prompt notification of Environment Canada (1-866-283-2333) and MDDEP (1-866-694-5454) early warning networks as well as SLSMC's emergency response and shipping management teams;
- Notification of municipalities downstream with water intakes that could be affected by the spill;
- Elimination of the source of the spill;
- Implementation of environmental protection measures (absorbent berms);
- Clean up of the affected area.

- Additional measures are required for work near the Aqueduct Canal:
  - Isolate water affected by work in the littoral sector of the Aqueduct Canal from raw water needed to supply the filtration plant by a method that minimizes sediment suspension from the canal bed;
  - Ensure that no contamination reaches the property of the Aqueduct Canal whether via storm sewers, contaminated soil, leachate from contaminated soil, or any other form of contamination;
  - If work is required near the Aqueduct Canal, this work must be performed within a contained enclosure in order to prevent suspended solids from spreading into the air and water;
  - Access to the banks of the Aqueduct Canal is prohibited;
  - If barges are used on the Aqueduct Canal, the following measures are required:
    - No combustion engine may be used in the waters of the canal;
    - Launching ramps are prohibited. Barges must be raised by crane.
  - All work on or near the Aqueduct Canal must be approved by the City of Montreal. Additional measures may be identified at a later date;
  - Debris is to be recovered by means of a tarpaulin stretched under the work area and removed as soon as possible.

During the operations phase

Some design criteria may be considered during preliminary engineering to mitigate the effect of road salt resulting from the project, i.e.:

- Meltwater will not be discharged directly into sensitive areas such as wetlands, sensitive fish habitats or migratory bird sanctuaries (see Figure 84) and a method for treating meltwater will be studied;
- The geometry of the structures must limit the accumulation of snow and ice on the infrastructures.

A road salt management plan must be developed to mitigate the environmental effects of road salt while maintaining road safety. The plan will be based on the Code of Practice for the Environmental Management of Road Salts (2004). It should be noted that road salt that will be used on the new infrastructures and which will be discharged into the river will make only a negligible contribution (in the order of 0.002%) to the concentration currently found in the river (22 mg/L). The Canadian recommendation for chlorine in fresh water is a maximum concentration of 120 mg/L (CCME, 1999b).

Performance objective

It was determined that to reduce the impact on surface water quality, the concentration of suspended solids during the work must not be 25 mg/l or 25 mg/l higher than the upstream value (for comparison purposes, historic SS concentrations are between 1.5 and 13 mg/L depending on the season and sectors in the Greater La Prairie Basin; see section 4.1.5.1).

Performance monitoring

The performance objective will be monitored and measured via a network of sampling stations located upstream and downstream of the sites to determine the degree to which the site is impacting the river's natural concentration of suspended solids. The number of stations in the network, the distance between the stations, their exact location and the frequency of readings will be determined based on the work site's parameters, such as river flow and environmental sensitivity. During the work, water quality will be measured several times a day using an *in situ* method calibrated by laboratory measurements. Monitoring will be done on an ongoing basis in the areas where work is to be done and in open water (sampling will not be done when ice is present). The final monitoring protocol will be developed during preparation of the final plans and specifications.

Where the threshold is exceeded, an alarm system will be triggered so that the appropriate corrective action can be taken quickly, such as:

- Modify work methods and eliminate the source of the contaminant;
- Clean the settling ponds and other protective equipment.

Although monitoring targets suspended solids, the samples taken will also enable monitoring for other contaminants, particularly in work sectors where contaminated soil is located nearby (Island of Montreal) or contaminated sediment is located in the vicinity (Lesser La Prairie Basin and Nuns' Island).

Monitoring data and corrective action that has been implemented will be posted on a website and made available to the public.

11.3 Air quality (local scale)

Sensitive areas

The following areas[3] are considered air quality-sensitive based on the direction of prevailing winds:

- Areas 1, 2 and 3 in Sud-Ouest Montreal;
- Areas 4a and 4b on Nuns' Island;
- Areas 5, 6 and 7 in Brossard.

[3] The air quality-sensitive areas and noise-sensitive areas are identical.

Description of effects and background

For this project, air quality will be affected both while the work is under way and during operation. Dispersed dusts, both fine (less than 2.5 microns) and total suspended particles, and atmospheric contaminants will affect air quality near the work areas and sensitive residential areas (less than 500 m from these work areas).

An air quality sampling station will be established on Nuns' Island at least 12 months before work begins in order to determine the baseline level of atmospheric contaminants in the sector. Data from nearby stations will also be used to establish the baseline. This data, combined with the project technical specifications (geometry, location, work methods), will allow accurate modeling of the dispersion of atmospheric contaminants and establishment of the areas of prime concern. At the same time, the data recorded will be used to prepare a regional picture of how particles and atmospheric contaminants are dispersed during the operations phase.

Air quality will be affected during the pre-construction, construction, post-construction and operations phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Traffic maintenance, installation of signage;
- Excavation, earthwork;
- Management of waste and hazardous materials (all phases);
- Machinery transportation, operation and maintenance (all phases);
- Deconstruction of structures;
- Infrastructure maintenance and repair.

Mitigation measures

During these activities, mitigation measures such as the following will be in effect:

- All during work in urban environments, daily cleaning of the streets used by vehicles and machinery to remove any accumulation of loose materials and other debris;
- Apply a dust suppressant (water or a dust suppressant approved by the Bureau de normalisation du Québec) on gravel traffic lanes when the quantity of dust raised when a vehicle passes exceeds 40 mg/m^3;
- Stabilize reworked sectors to limit wind erosion by seeding them or by covering them with straw or geotextile, depending on how advanced the work is;
- Cover piles of material with geotextile if they are not in use for more than 24 hr;
- Use adequate signage and impose appropriate maximum speeds to reduce dust emissions on access roads and work surfaces;
- Establish a truck route that avoids residential sectors;
- Fires and waste burning on or near the construction site are prohibited at all times.

Performance objective

To reduce the impact on air quality, it has been determined that work shall meet a threshold of 30 µg/m^3 for fine particles and 120 µg/m^3 for total particles[4] (24 hr-average) 50 m from the footprint.

Performance monitoring

The performance objective will be monitored and measured by sampling stations around the worksites to identify the contribution of the effects of the worksite on the dispersion of dust. The stations will be installed based on the wind direction, the type of work and the presence of sensitive areas. The most dust is raised during excavation, earthwork and deconstruction of structures. Monitoring will be conducted every two weeks from April to October in the areas where the work has taken place. Furthermore, the Nun's Island's air quality sampling station will allow monitoring globally air quality in the sector.

Where the threshold is not met, corrective mitigation measures such as these shall be implemented:

- Modify work methods by using equipment with dust capture systems;
- Install protective tarps when the work generates dust;
- Encourage the use of wet sprays to limit dust;
- Redesign work areas to reduce the amount of dust raised (move piles of material, etc.).

Monitoring data and the corrective measures implemented will be publicly available on a website.

11.4 Air quality (GHG)

It is difficult at this stage of the project to establish the traffic parameters on the new structure, and thus to know what traffic flows will be. Traffic studies are now under way. These flows will depend to a great extent on the public transportation provided and the type of transportation proposed. Simulations of variations in GHG emissions show that there may be, despite increased traffic flows at rush hour, a reduction in GHG emissions if these increases in flow are accompanied by better fluidity or higher speeds than were the situation in 2012 (see Figure 85, for example).

Discussions under way between Transport Canada and the Agence métropolitaine des Transports will lead to a concerted approach to efficient public transportation on the new bridge.

After the preliminary engineering stage, it will be possible to adjust speed and traffic flow parameters for the future scenario and thus define changes in GHG emissions compared to the situation in 2012.

On a larger scale, GHG emissions during the work will be offset to make the worksite "carbon neutral". During the construction phase, annual emissions will be calculated based on the number of kilometres travelled by the machinery and transportation of materials and excavations. Compensation may take the form of buying carbon credits or of carrying out independent projects (such as planting trees).

[4] The CMM's criterion is 150 µg/m^3 but the maximum acceptable level in the national objectives is 120 µg/m^3.

11.5 Vegetation and wetlands

Sensitive areas

The following areas are considered to be sensitive for vegetation and wetlands:

- Emergent nearshore marshes;
- The common reed swamp along the shore at Brossard.

Description of effects and background

Vegetation and wetlands will be affected during the pre-construction, construction, post-construction and operations phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Relocation and protection of public utility infrastructures;
- Soil stripping and land clearing;
- Excavation and earthwork;
- Work in aquatic environments;
- Deconstruction of structures;
- Presence of infrastructure.

Construction work will cause a loss of vegetation mainly from uncultivated shrubland and grassland (9,100 m^2) and from poplar stands (3,425 m^2). Potential wetland losses are estimated at 4,300 m^2 for the common reed swamp. Losses of emergent nearshore marshes (2,000 m^2) are calculated in with the losses of fish habitat because they are below the high-water mark.

Mitigation measures

The Federal Policy on Wetland Conservation (EC, 1991) recommends a three-pronged approach: Avoid, minimize and compensate losses of wetlands.

Before the work

To meet the Policy, project design must avoid or minimize, as much as possible, encroachments onto wetlands by the piers and abutments of the new structures.

During the work

Mitigation measures will be implemented from the start to mitigate effects on vegetation, in particular:

- Specimens of rough water-horehound and Laurentian water horehound will be transplanted when possible to similar habitats;
- All necessary measures will be taken to protect those trees and shrubs that are to be maintained from any damage or mutilation (i.e., installation of a protective perimeter);
- In case of drought, trees maintained on the worksite will be irrigated.

At the end of the project, the work areas will be seeded with native species. Particular attention will be paid to naturalizing the banks to recreate suitable habitats, including those for wildlife.

Compensation

A compensation plan will be needed to replace the ecological functions of 4,300 m^2 of wetlands. The details of the plan will be determined once the preliminary engineering is completed.

Performance objective

No performance objectives have been set for vegetation and wetlands.

Monitoring and follow-up

A five-year follow-up will be required under the wetlands compensation plan to validate whether environments that have been improved, reclaimed or created are functioning.

Revegetation after the project will also be monitored for two years. The proportion of follow-up will be calculated and more plants will be planted if the proportion drops below 90%.

11.6 Fish and habitats

Sensitive areas

The following areas[5] are considered to be sensitive for fish habitat:

- Type 2, 13 and 22 habitats along the eastern shore of Nuns' Island (moving water and banks with good potential for spawning, nurseries and feeding);
- Type 4 habitats along the shore at Brossard (quality seagrass beds with potential for spawning and nurseries);
- Type 12 and 16 habitats near the Seaway dike (quality aquatic plant communities with potential for nurseries and feeding);
- Type 13 habitats along the western shore of Nuns' Island (moving water with potential for spawning and feeding).

Description of effects and background

The project will result in deterioration, disruption and destruction of the fish habitat. The impacts will be caused in particular by permanent and temporary encroachments on fish habitats considered to be sensitive, as well as by potential modifications to the hydraulic regime during the work and the operations phase. These modifications will be specified when the plans and specifications have been prepared and the simulations executed.

[5] **The location of habitats is given in Figure 73 in Part I of the Environmental Assessment Report describing the project and the environment.**

Fish habitat will be affected during the construction, post-construction and operations phases by the following activities:

- Soil stripping and land clearing;
- Excavation, earthwork;
- Work in aquatic environments (construction and post-construction);
- Transport, operations and maintenance of machinery (all phases);
- Deconstruction of structures;
- Infrastructure maintenance and repair;
- Presence and use of infrastructure.

According to the worst-case scenario, all the work on this project (construction and operation of the new bridge and deconstruction of the existing bridge) will destroy 5,865 m^2, degrade 12,050 m^2 and disturb 34,200 m^2 of fish habitat. Permanent and temporary losses in the sensitive areas represent 2% of the sensitive areas found in the study area. Resuspension of sediments in the river water could return particles to the water and disturb habitat quality. The presence of temporary structures and piers is likely to modify flow speeds and affect the migration of fish in the study area. Vibrations associated with the use of explosives could cause mortality among certain fish.

One species of concern under the *Species at Risk Act*, the American eel, and four species protected under the Quebec's legislation (American shad, chain pickerel, lake sturgeon and rosyface shiner) occurring in the study area could be affected in the same way as the other species.

Mitigation measures

Before the work

Once the structures have been designed and before construction begins, the ice regime and flows will be modeled in order to predict the effects of the temporary structures and new piers. Modifications to flow conditions should not have any effect on flow patterns and speeds in the main fish migratory routes (Greater La Prairie Basin and Nuns' Island channel). Additional measures may be required.

The report of net losses will have to be reviewed once the plans and specifications are completed.

During the work

Mitigation measures will be implemented as soon as the work begins to prevent suspended material and contaminants from entering surface water. These substances are listed in the section on surface water. As well, measures specific to fish habitat are planned, principally the following:

- Perform work in the water outside of sensitive periods for fish species present in the waterways. Periods of restriction will be identified for fish habitats felt to be sensitive (Table 71 and Figure 84) and will take into account the species of fish that are found in them and their use (reproduction, nurseries, migration, etc.). Ranges of protection will be adapted to the species and the fragility of the environment;

- Maintain constant free circulation of water and sufficient inflow of water to preserve the functions of the fish habitat (feeding, nurseries, spawning) downstream from the work area. Take the measures needed to prevent impacts (i.e., flooding, dewatering, material in suspension, erosion, etc.) upstream and downstream from the work area;
- Restore the banks and beds of the watercourses affected by the work to their original state (granulometry, bed profile, etc.) after dismantling of the temporary structures throughout the disturbed areas;
- Limit the use of riprap on the banks of the watercourses up to the natural high water mark (two-year return period), and replant the band along the river at the edge of the riprap using recognized vegetation engineering techniques that encourage overhanging shrub and grass. Revegetation must be undertaken as swiftly as possible after the earthwork is finished, using mainly native species;
- Recover all fish captured in the cofferdams and immediately return them to the aquatic environment to prevent any fish mortality;
- Set up a structure (e.g., screen) at the entrance to the pump intake pipe to prevent aspiration of fish;
- Refrain from releasing any debris, concrete residues or damp mortar into the aquatic environment. All debris accidentally introduced into the aquatic environment must be removed as quickly as possible;
- Comply with DFO (1998) standards for the use of explosives near or in aquatic environments. If it is not possible to comply with DFO's requirements regarding explosives, an application to destroy fish by means other than fishing must be submitted to DFO.

Compensation

In compliance with the *Fisheries Act*, a compensation plan approved by DFO will be implemented to replace habitats destroyed by permanent and temporary encroachments. The details of the plan will be known at a later stage and will be part of the requirements for the authorization under the *Fisheries Act* that will be issued by DFO.

Performance objective

The design of temporary structures shall maintain speeds of flow similar to that found in each type of habitat (see Table 32 in Part I of the Environmental Assessment Report). Additional measures may be required if speeds are not maintained.

Performance monitoring

The performance objective will be monitored and measured using current meters (at least two) installed upstream and downstream from the jetty. Measurements will be taken after construction of the jetty to validate the model. The monitoring protocol will be drafted after the final specifications and plans.

If the objective is not met, appropriate corrective measures will have to be implemented such as:

- Adding another culvert to the jetty;
- Modifying the flow pattern.

11.7 Terrestrial wildlife

Sensitive areas

The following areas are considered to be sensitive for terrestrial wildlife:

- The Seaway dike;
- The spaces on either side of the Nuns' Island bridge, where brown snakes are found.

Description of effects and background

With respect to the project, terrestrial wildlife will be affected by the work itself and by habitat loss.

The wildlife will be affected during the pre-construction, construction, post-construction and operations phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Soil stripping and land clearing;
- Deconstruction of structures;
- Presence of infrastructure.

The construction will cause a loss of terrestrial habitats for mammals and herpetofauna (13,000 m^2 of terrestrial vegetation and 6,300 m^2 of wetlands). The mammals will be bothered by the work and will have to move to get some peace and quiet. The habitat of the brown snake, a species liable to be designated as threatened or vulnerable in Québec, in the project footprint will be disturbed and there are risks of mortality for this species and for other species of herpetofauna.

Mitigation measures

Before the work

To reduce risks of mortality, the brown snake population will be moved to a similar habitat nearby before the work starts. The perimeter of the work areas will be fenced to keep them from coming back. The fences will also be effective for certain mammals and the other species of herpetofauna.

During the work

The measures implemented before the work will prevent most effects on terrestrial wildlife. During the work, the fences must be kept in place.

After the project, the work areas will be restored to their natural state, and this process will create new habitats suitable for terrestrial wildlife.

Performance objective

No performance objectives have been set for terrestrial wildlife.

Monitoring and follow-up

Brown snake relocation will be monitored twice-yearly over a four-year period to confirm that the snakes have adapted to their new habitat.

11.8 Avifauna

Sensitive areas

The following areas are considered to be sensitive for avifauna:

- Couvée Islands Migratory Bird Sanctuary;
- Nuns' Island waterfowl gathering area;
- Peregrine falcon nesting site on the Champlain Bridge;
- Rocky islets near Nuns' Island.

Description of effects and background

With respect to the project, avifauna will be affected by the work itself and by habitat loss.

Avifauna will be affected during the pre-construction, construction, post-construction and operations phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Soil stripping and land clearing;
- Work in aquatic environments (construction and post-construction);
- Deconstruction of structures;
- Presence of infrastructure.

The construction work will cause a temporary or permanent loss of terrestrial and aquatic habitats for avifauna (13,000 m^2 of terrestrial vegetation, 6,300 m^2 of wetlands and 37,000 m^2 of grasslands) including certain protected habitats (MBS and WGA). Birds using the sector could also be disturbed during the nesting period (mid-April to mid-August in this sector). Peregrine falcons, a species of concern nesting on the Champlain Bridge, will have to be relocated while the work is under way. Certain rocky islets near Nuns' Island that may be used by common terns will no longer be suitable for nesting during the work.

Chimney swifts are a threatened species, but they are quite common in urban environments because they nest or rest in unused chimneys (COSEWIC. 2007). It is extremely rare for them to be confirmed to be nesting in a hollow tree. This would require very large diameter (50 cm plus) tree, and these are very rare or nonexistent in the study area. As specified in Section 4.4.5 of the Part I of the Environmental Assessment Report, the habitats encountered are mainly natural early succession environments colonized by pioneer flora typical of unused land in a metropolitan region. No effects are anticipated because the habitat found it not a favourable place for it to nest.

The type of structure planned for the New Bridge for the St. Lawrence could also affect the rate of avian mortality. The presence of guy cables and architectural lighting increase the risks of avian mortality, especially during periods of nocturnal migration.

Mitigation measures

Before the work

The preliminary engineering will have to consider effects on birds, especially in the choice of the type of structure. For example, the following should be considered:

- Low-intensity, low-wavelength lights should be preferred over red and yellow lights. Light standards should be directed downwards;
- Any required signal light system design should be designed with flashing lights.

During the work

Mitigation measures will be implemented as soon as work begins to prevent the destruction or disturbance of nests, eggs or birds, in particular:

- Carry out or start work outside nesting times for birds whose nesting schedule normally ranges from mid-April to mid-August in the study area;
- Work on and in the vicinity of the Couvée Islands Migratory Bird Sanctuary must be performed in accordance with EC requirements;
- Manage, relocate and if necessary add falcon nesting boxes depending on the sectors of activity. Retain the services of an expert on birds of prey to advise the private partner and encourage coexistence between workers and this species whenever possible;
- Verify the peregrine falcon nest on the bridge before starting deconstruction. If there are nesting birds, organize a 250-m exclusion zone centred on the nest until the young have been raised, or about 75 days after the eggs are laid;
- Work with Environment Canada’s Peregrine Falcon Recovery Team to develop an appropriate way to install nesting boxes. Artificial peregrine falcon nesting boxes must be moved to or installed under the structure of the new bridge or in a suitable site nearby.

Performance objective

No performance objectives have been set for avifauna.

Monitoring and follow-up

With a cable-stayed bridge, it would be appropriate to establish a monitoring program for avian mortality, especially during periods of migration. The program is even more necessary because bird carcasses on the lanes can have an impact on highway safety.

11.9 Infrastructure and buildings

Sensitive areas

The following area is considered to be sensitive for infrastructure, land and buildings:

- Access to Nuns' Island.

Description of effects and background

Infrastructure, land and buildings will be affected during the pre-construction, construction and post-construction phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Traffic and navigation maintenance, installation of signage;
- Relocation and protection of public utility infrastructures;
- Excavation and earthwork;
- Construction of infrastructures;
- Deconstruction of structures;
- Transport, operations and maintenance of machinery (all phases).

The work areas and detours may encroach on private land along the footprint. Vibrations associated with construction work such as soil compaction and driving pilings and sheet-pilings may damage buildings and infrastructure. Trucking may have an effect on road structure. Finally, the road network in the sector may have problems with dirty lanes and with congestion associated with closing certain stretches. Considering that Nuns' Island is indeed an island, access while work is underway may be limited both for local traffic and for emergency vehicles. This access problem does not exist for Montreal and Brossard because they have several access routes.

No expropriations are planned at this stage of project development, but one piece of private land may be acquired.

Mitigation measures

Mitigation measures will be implemented during the project, including:

- Minimize encroachment of by-passes onto private land. The private partner will have to come to an agreement with owners with respect to encroachment on private land;
- The public will be notified of the work and of the detours provided. Alternate routes will be proposed;
- At least one access to Nuns' Island, and preferably two, will be maintained at all times on the local road and highway systems;
- Favour the corridor footprint as the principal access to the construction zones and, as far as possible, limit the movement of machinery to the work areas located within this corridor;

- The private partner must ensure that underground infrastructure is clearly identified in the plans and in the field;
- Perform an inspection before any work likely to cause damage and adjust work methods in consequence;
- The private partner must establish an alternate transportation system and organize parking near the worksite restricting access to the local network;
- When working in urban areas, remove loose material and other debris on a daily basis from streets used by vehicles and machinery;
- When the work is done, the private partner shall rehabilitate the land and infrastructure.

Monitoring

There will not be any specific monitoring for this factor. A website and a telephone line will be available to provide information and record complaints from citizens. Any adjustments implemented will be published there as well.

11.10 Commercial navigation

Sensitive areas

The following area is considered to be sensitive for commercial navigation:

- The Seaway channel.

Description of effects and background

With respect to the project, work could encroach on the Seaway channel and affect commercial navigation.

Commercial navigation could be affected during the pre-construction, construction, post-construction and operations phases by the following activities:

- Navigation maintenance, installation of signage;
- Excavation of earthwork;
- Construction of infrastructures;
- Work in aquatic environments (construction);
- Deconstruction of structures;
- Infrastructure maintenance and repair.

Obstructions due to construction could reduce clearance in the Seaway. Work on and near the dike could compromise its watertightness.

Mitigation measures

Before the work

Transport Canada and the SLSMC have to negotiate a memorandum of understanding to set the conditions regarding work on the dike and above the Seaway while maintaining safe commercial navigation. A lease will also be needed to establish work areas on the dike. Discussions are under way between Transport Canada and the SLSMC.

During the work

The conditions agreed upon must be met for the duration of the work, including maintaining navigation clearance.

Monitoring

The SLSMC will enforce the private partner's compliance with the conditions of the memorandum of understanding.

11.11 Tourist and recreational activities and recreational boating

Sensitive areas

The following areas are considered to be sensitive for tourist and recreational activities and recreational boating:

- Lesser La Prairie Basin (recreational boating, and tourist and recreational activities);
- The Route Bleue around Nuns' Island (recreational boating);

Description of effects and background

Tourist and recreational activities and recreational boating will be affected during the pre-construction, construction and post-construction phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Traffic and navigation maintenance, installation of signage;
- Relocation and protection of public utility infrastructures;
- Soil stripping and land clearing;
- Construction of infrastructures;
- Work in aquatic environments (post-construction);
- Deconstruction of structures;
- Transport, operations and maintenance of machinery (post-construction).

The work areas may encroach on the bike paths that cross the project footprint on Nuns' Island and in Montreal and Brossard. Traffic on the path along the Seaway and the Estacade (Route Verte #1) may

also be hindered during the work. Work in the water will limit recreational boating, fishing and windsurfing in these sectors. Itineraries on the Route Bleue (Lesser La Prairie Basin and Nuns' Island) will be affected. Passing under the structures will be prohibited during construction periods and this could detract from land- and water-based recreational activities.

It is also quite probable that there will be heavy traffic on the river during the work to move materials, workers and barges. A navigation management plan will be needed.

Mitigation measures

During the work

Mitigation measures will be implemented during the project, in particular:

- When possible, keep a cycling link open at all times between the South Shore and Montreal, including Nuns' Island;
- When possible, inform users of cycling links of safe detours and closure periods. As for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to shipping issued through the CCG's Marine Communications and Traffic Services;
- Issue notices to boaters regarding temporary and permanent obstructions;
- Remove the piers of the present bridge so as not to cause any obstacles to recreational boating.

Monitoring

A website and a telephone line will be available to provide information and record complaints from users. Any adjustments implemented will be published there as well.

With respect to navigation, TC's Navigable Waters Protection Program will enforce conditions attached to authorizations under the *Navigable Waters Protection Act*. Worksite visits will be carried out to ensure compliance with temporary mitigation measures and, if necessary, the needed adjustments will be demanded to ensure the safety of recreational boating and commercial navigation.

During deconstruction of the piers of the existing bridge, bathymetric surveys will be required to ensure that the remains of the piers do not cause any obstacle to navigation.

11.12 Sound environment

Sensitive areas

The following areas are considered to be noise-sensitive:

- Areas 1, 2 and 3 in Sud-Ouest Montreal;
- Areas 4a and 4b on Nuns' Island;
- Areas 5 and 7 in Brossard.

Description of effects and background

The sound environment will be affected during the work and operations phases of the project. The noise from the work and traffic will have an effect on the sound environment near the work areas and in sensitive residential areas (less than 300 m from the footprint).

Noise sampling and modelling have shown that the sound environment in a number of sectors (Figure 84) will deteriorate if no anti-noise measures are taken. Machinery, driving pilings and other construction activities will increase noise from time to time during the work. Highway traffic on the new infrastructure could modify the present sound environment and affect human health.

The sound environment will be affected during all phases by the following activities:

- Site mobilization and construction of temporary facilities;
- Traffic and navigation maintenance, installation of signage;
- Transport, operations and maintenance of machinery (all phases);
- Presence and use of infrastructure.

Mitigation measures

During the work, mitigation measures such as the following will be in place to reduce noise:

- Install temporary anti-noise screens when machinery exceeds the standards in effect (percussion drill, compressors);
- Locate worksite facilities to block sound dispersion (worksite trailer between sensitive areas and the worksite);
- Install mufflers on noisy equipment (percussion drill covered with an insulating tarp);
- When possible, permanent noise barriers will be installed before construction work begins in order to maintain an appropriate sound environment.

Performance objective

To reduce the effect on the sound environment, the following thresholds will have to be met: sound level exceeded 10% of the time ($L_{10\%}$) must not exceed 75 dbA during the day; must not exceed ambient noise levels when work is not taking place +5 dbA in the evening and at night.

During the operations phase, traffic noise must not exceed 60 dBA or an increase of 1 dBA above 55 dBA, or anti-noise measures must be implemented in the affected areas.

Performance monitoring

Performance objectives during the work will be monitored and measured by noise sampling stations located 5 m from sensitive areas over 24-hour periods using calibrated sound level meters. These latter will be moved as the work progresses.

In situations where the thresholds would be exceeded, corrective measures such as these shall be implemented:

- Modify work methods by using equipment with mufflers;
- Modify work schedules;
- Install temporary anti-noise screens.

Monitoring data and corrective measures implemented will be available to the public via a website.

When the infrastructures are in operation, acoustic monitoring will be conducted after one, five and ten years to ensure that anti-noise measures are effective. This monitoring program will take place in each sensitive area and will show where corrective measures are required.

11.13 Heritage and archeology

Sensitive areas

The following areas are considered to be sensitive for archeology and heritage:

- The Le Ber archeological site (BiFj-01);
- Area S-1 in Brossard;
- The site of a prehistoric First Nations burial ground (BiFj-49).

Description of effects and background

Infrastructure construction could destroy archeological remains in sensitive areas. Following an assessment of the potential effects of the project, it was determined that no effects are expected on the site where the First Nations burial ground (BiFj-49) was discovered, given how far it is from the work areas.

Archeology and heritage will be affected during the construction and operations phases by the following activities:

- Soil stripping and land clearing;
- Excavation and earthwork;
- Construction of infrastructures;
- Presence of infrastructures.

Mitigation measures

Before the work

As the project is near an archeological site, design criteria will have to be considered during the preliminary engineering stage. Project design will have to minimize the encroachment of the abutment and redevelopment of René-Lévesque Boulevard on the Le Ber archeological site (BiFj-01). As well,

Transport Canada will have to discuss with the government of Quebec and the City of Montreal how to promote the historical character of the site.

An archeological inventory survey will have to be conducted in the S-1 area of archeological potential. Should archeological remains be discovered, a site assessment will be made and a recommendation will be issued on the measures to be taken to either protect the site or conduct a dig (see Figure 84).

During the work

Mitigation measures will be implemented when the work begins in identified areas of archeological potential to limit potential loss or disturbance of remains, in particular:

- If soil is excavated to construct the infrastructure base, backfill should be mechanically stripped down to the level of the ancient soil, and then a checkerboard dig of the areas affected should be conducted. Ancient soils are found at a depth of approximately 1 m in this sector. Exploratory stripping should be carried out under archeological supervision.
- If soil is not excavated for the construction of the new infrastructure, a protective layer could be spread over the existing soil to seal the site.
- Any discovery of archeological remains must immediately be communicated to the MCCQ.

Performance objective

No performance objectives have been set for archeology and heritage.

Performance monitoring

It is recommended that an archeologist be on site during excavation work in areas of archeological potential. The work must stop if artefacts are found, the site must be assessed and a recommendation issued with respect to the measures needed to either protect them or conduct a dig.

11.14 Project integration with its environment

Sensitive areas

The following area is considered to be sensitive for project integration with its environment:

- The landscape of the Montreal region

Description of effects and background

The presence of the infrastructures will have an effect on the Montreal landscape both locally and regionally.

Mitigation measures

Before the work

Project design needs to integrate the project with its urban environment in order to conserve existing strengths and to improve on the weaknesses of the site of this major infrastructure. The following measures are recommended:

- The New Bridge for the St. Lawrence will have to be emblematic of its major role in the Montreal landscape and as a visual landmark for the region by means of an appropriate aesthetic.
- Visual experiences of the river and the city from the bridge must be maintained (i.e., by using see-through cable barriers).
- The project must emphasize and consolidate the existing network of bike trails and the scenic views it provides.
- Residual spaces should be landscaped so that they contribute to an entranceway to the city.
- Study improving connectivity between Sud-Ouest and Verdun.
- Include a link below the bridge structure to connect the bike and walking trails on the banks.

All these measures would contribute to optimal integration of the project for the new bridge in a contemporary urban environment turned toward providing quality living environments, development along the riverbanks and iconic views of downtown Montreal.

Performance objective

There are no performance objectives associated with this component.

12 DECISION BY RESPONSIBLE AUTHORITIES

The responsible authorities will make their decision based on the screening report and public comments. The decision will be made and signed in the summary report.

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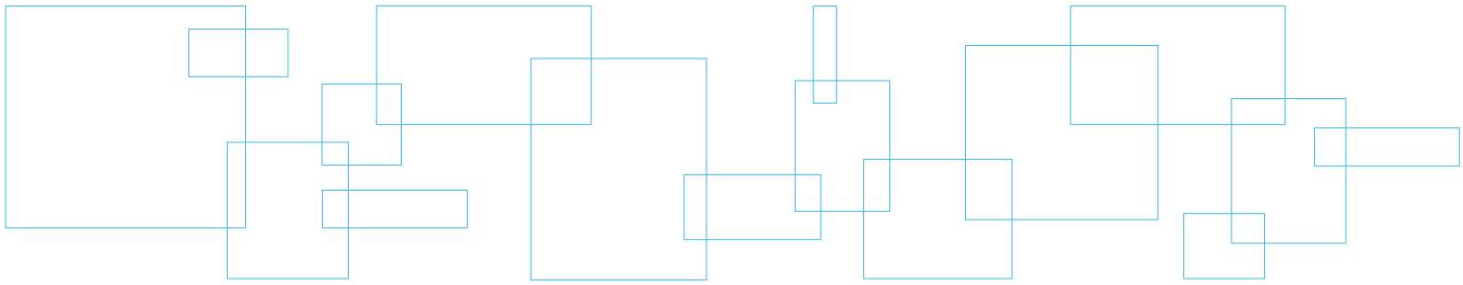
Appendix 1 Public Concerns – Transport Canada Response



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SUMMARY TABLE OF PUBLIC COMMENTS AND RESPONSES FROM DESIGNATED AND FEDERAL AUTHORITIES

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
Description of the Environment/Project's Effects/Mitigation Measures		
1	Concerns about the project's effects on traffic volumes during the work. Would like more detailed information on the impact that traffic generated by the detours will have on the neighbourhoods during the work period.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the mitigation measures (see Section 11.9).
2	The project foresees some increase in capacity, which might generate more traffic during the operations phase.	Even though it is still too early to determine the amount of traffic that will be generated, traffic and greenhouse gas emission simulations were conducted as part of this environmental assessment. More information on these aspects can be found in the first and second sections of the environmental assessment report. It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. It should be noted that the New Bridge project involves replacing existing infrastructure and not adding a new infrastructure to an area that did not have one. The project's impact on traffic, for example, is much lower than in the second case. Improving public and active transportation and adding a toll booth will help decrease the project's impact on traffic.
3	Concerns about the project's effects on air quality.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (see Sections 8.1, 11.3 and 11.4).
4	What methodology was used to identify significant issues? Will the issues identified in the environmental evaluation as not significant (i.e. air quality, greenhouse gases) not be taken into consideration in designing the project?	This sentence has been changed (page 261 of the first part of the environmental assessment report).

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
5	Proposal to take greenhouse gases generated by increased traffic into consideration.	Even though it is still too early to determine the amount of traffic that will be generated, traffic and greenhouse gas emission simulations were conducted as part of this environmental assessment. More information on these aspects can be found in the first and second sections of the environmental assessment report. It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. It should be noted that the New Bridge project involves replacing existing infrastructure and not adding a new infrastructure to an area that did not have one. The project's impact on traffic, and thus on greenhouse gas emissions, for example, is much lower than in the second situation. Improvements in public and active transportation, as well as the addition of toll booths will also decrease the project's impacts on traffic and greenhouse gas emissions.
6	Proposal to consider the project's impact on air quality during the construction period.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.3).
7	Proposal to add greenhouse gas emission evaluations to the project's environmental assessment, and to specifically focus on projections of potential future emissions under different traffic volume scenarios.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.4).
8	Proposal to compare air quality results based on modeling with averages from a larger area, ideally located under dominant wind currents and with more than one measurement station.	For this environmental assessment, traffic and greenhouse gas emission simulation exercises were conducted. More information on these aspects can be found in the first and second sections of the environmental assessment report. It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. Based on these studies, a detailed analysis of greenhouse gas emissions and air quality will be performed.
9	Proposal to add air sampling stations on Nuns' Island, and that all sampling stations should be able to test for the presence of fine particles.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 11.3 and 11.4) An additional sampling station will be set up on Nuns' Island.
10	Proposal to add an air quality sampling station downwind from the bridge, at a location where contaminants blown toward residential areas by dominant wind currents can be adequately measured.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 11.3 and 11.4) An additional sampling station will be set up on Nuns' Island.
11	Proposal to take samples to determine the current situation in terms of atmospheric pollutants before construction begins.	These types of samples will be taken before the work begins. A sampling station will be installed on Nuns' Island.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
12	Concern about noise generated by the project during the construction and operations phases. This component will be emphasized in the project's upcoming phases in order to provide local residents with adequate mitigation measures (efficiency, social acceptability, aesthetics, graffiti prevention, paving materials, etc.). These effects should also be considered for non-residential areas.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.12).
13	Proposal that mitigation measures related to noise pollution be acceptable both from the noise reduction and the aesthetic point of view.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.12) Aesthetic design criteria indirectly respond to this issue.
14	Proposal evaluating noise impact over a distance greater than 300 m.	The 300 m distance is a standard established by the Quebec Ministry of Transportation (MTQ). However, subsequent to public comments, Transport Canada used a method that enabled inclusion of more noise-sensitive sectors (Section 11.12).
15	Concern that no standard that takes into account night-time noise is included in the MTQ's road noise policy.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.12).
16	Concern about vibration generated by the project.	The public transportation method, which is likely to cause vibrations, will be selected by the Metropolitan Transportation Agency. Vibration generated during the construction phase will be included in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures.
17	Proposal to improve the fish map.	The map in question meets the Department of Fisheries and Oceans (DFO) standards.
18	Proposal to include the fox den on the South Shore.	This was added to the first report on the project description and the environment.
19	Proposal to compensate for the loss of wildlife habitat on the South Shore.	Although we know that compensation projects will be required, they have not yet been drawn up. They will be prepared when more details on the project are available. Proximity to the study area will be one of the criteria considered in the selection of these projects.
20	Suggestion that brown snakes be relocated to Verdun.	In theory, the compensation project will focus on the actual site, near to or within the same watershed.
21	Proposal to include fathead minnows and American eels in the summary report.	This information is already in the first part of the summary environmental assessment report on the project description and the environment.
22	Proposal to take samples at the site in order to check for the presence of at-risk species' spawning grounds in the work area.	Data gathered during the environmental assessment phase are deemed to be sufficient.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
23	Proposal to increase the effort to inventory amphibians, reptiles and birds.	The inventories that have been completed meet the environmental assessment's needs, and the volume of information meets the appropriate authorities' requirements. Additional inventories would not change the assessment of the area.
24	Proposal for various specific measures related to relocation and monitoring of brown snakes.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.7).
25	Proposal to place greater emphasis on the Chimney Swift and the Common Tern.	There is no conflict between the project and these species (Section 11.8 of the second part of the environmental assessment report).
26	Proposal that on the Verdun side, the vacant area alongside the Décarie Expressway could be made into a small wildlife refuge for the brown snake when the work is complete.	This suggestion will be considered when the relocation plan is prepared.
27	Proposal discussing the Black-throated Blue Warbler and the fragmentation of its habitat.	There is no conflict between the project and this species. As with the majority of woodland birds, the Black-throated Blue Warbler is sensitive to fragmentation of its natural habitat due to roads and other manmade structures, specifically in large cities. At this time, the project does not foresee any habitat fragmentation, given that the work site is largely free of trees and therefore has no impact on the Black-throated Blue Warbler.
28	Proposal presenting amphibian data as a table that separates atlas data and field inventory data from 2012.	See Appendices 10 and 11 in the first part of the environmental assessment report on the project description and the environment.
29	Concerning the Peregrine Falcon, proposal to incorporate nesting ledges into the design of the new bridge. You could also consider leaving some of the current bridge's pillars in place for this purpose.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.8).
30	Proposal to add new components to the description of plant communities, such as the level of disturbance, the ground surface, the population's age classification, physiognomy and form.	This is not required because no wooded areas will be affected by the project.
31	Proposal to review the designation of certain wetland areas, specifically emergent swamps.	Reviewing the designation would not add any value in terms of assessing the fish, reptile and amphibian habitats. Wetlands were classified using the Canadian Wetland Classification System (National Wetlands Working Group, 1997) (p. 158 of the first part of the environmental assessment report).
32	Proposal that the excavation and fill mounds created by the construction work along the banks could potentially bring long-term benefits to flora and fauna if they are left in place after the work ends.	During the preliminary engineering stage, studies will be conducted in order to ensure that mitigation measures are integrated into the plans and specifications prepared for the calls for tender for the construction of the New Bridge. The mitigation measures will be refined during these studies and this suggestion may be retained if it is deemed feasible.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
33	Proposal that waste and sediment produced during the dredging and excavation of the St. Lawrence river for the new pillars could be left in place or nearby, forming small islands and/or shoals for nesting birds or spawning fish.	During the preliminary engineering stage, studies will be conducted in order to ensure that mitigation measures are integrated into the plans and specifications prepared for the calls for tender for the construction of the New Bridge. The mitigation measures will be refined during these studies and this suggestion may be retained if it is deemed feasible.
34	Concerning the brown snake, proposal that a temporary refuge site be built during the work period, to house specimens rescued on the site.	The brown snakes will be permanently relocated. The planned approach uses an exclosure. Only individuals found in the exclosure will be relocated. Once the work is complete, the exclosure will be removed and the brown snake may recolonize the new environment (second part of the environmental assessment report).
35	Concerning amphibians, proposal to replace soil during the work, to easily recreate favourable environments without high costs, simply by grading the surface for this purpose.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.7).
36	Proposal of a criterion of zero spread of an invasive species between the work site and the environment.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures.
37	Proposal to implement specific measures to avoid propagation of common reed grass.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures.
38	Concern that no ecotoxicological study on aquatic fauna has been done (especially related to the Technoparc).	Given the high dilution potential of the receiving environment (river), these studies are not deemed necessary. However, the river's chemical quality will be monitored and an alert system will be put in place.
39	Proposal that improved contamination levels be included in the specifications.	All the soil moved as part of this project will be managed in accordance with existing standards. If containment measures are required, coordination will be organized with Jacques Cartier and Champlain Bridges (JCCBI). Measures will be taken to ensure that the project does not harm the Technoparc restoration work completed by JCCBI.
40	Where will the contaminated soil loads be sent?	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 9.8.4 of the second part of the environmental assessment report). Contaminated soil will be treated according to accepted standards; see the list of authorized sites at http://mddep.gouv.qc.ca/sol/residus_ind/recherche.asp.
41	Current standards and policies on contaminated soil must be complied with during construction work.	All the soil moved as part of this project will be managed in accordance with existing standards.
42	Proposal that measures to protect the river water be implemented as soon as the construction site is set up.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.2).
43	Proposal to specifically consider the water table in the Technoparc area.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.1).

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
44	Proposal to avoid recirculating sediment into the Lesser La Prairie basin.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.2).
45	Concern about the project's impact on drinking water.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.2).
46	It is important that the study includes a complete description of the ice formations opposite the Champlain Bridge, taking into account the key role of the ice control structure.	The information in the first part of the environmental assessment report on the project description and the environment is sufficient for environmental assessments. In-depth studies on the ice formations will be considered during the preliminary engineering phase.
47	Construction of the New Bridge for the St. Lawrence should be included in the context of finding a solution to the problem of contaminated water flowing into the river and cleaning the soil/banks.	There is no direct link between the Technoparc restoration project and the New Bridge over the St. Lawrence project. All the soil moved as part of this project will be managed in accordance with existing standards. If containment measures are required, coordination will be organized with JCCBI. Measures will be taken to ensure that the project does not harm the Technoparc restoration work completed by JCCBI.
48	Proposal to take into account management of rainwater during the time when the new and old infrastructures are both present.	This issue will be considered during the preliminary engineering phase.
49	Proposal to implement the City of Montreal water department's protective guidelines to the water in the Aqueduct Canal.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.2).
50	Proposal to closely track the suspended sediment concentration in the water throughout the work period.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.2).
51	Concern that no soil assessment study will be done before the repaving work on Highway 15 begins. Would it be possible to include an analysis of all of the soil that will be displaced, excavated and removed during the project?	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.1).
52	Proposal that a detailed assessment of the pollution and disturbances caused by the work site be done, and that concrete measures to reduce these effects be taken.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 11.3 and 11.12).
53	Concern about the impact on residents of the area between the Highway 10 frontage road adjacent to Voltaire Street and the actual highway; considered as an essential area for the work site to use if a certain construction method is planned for the bridge.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 11.3 and 11.12).

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
54	Concern about the small size of the roads that might be used for trucks (e.g. Rome Blvd. in Brossard).	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.9) Mitigation measure CCDG 7.11 deals with this issue (Section 7.4 of the second part of the environmental assessment report).
55	Suggestion to set up a phone line for residents to complain if noise levels and work guidelines are not complied with.	A phone line or other similar method will be set up, to allow the public to provide information about issues caused by the project.
56	Proposal to create an incentive, or better yet, a requirement for trucks crossing the Island of Montreal to use Highway 30.	Highway 30 is an alternative to the current bridge for truck drivers.
57	Proposal to specifically focus on the mitigation of wind erosion and sediment, during and after the construction work.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.1).
58	Proposal to ensure that traffic plans allow access for emergency vehicles.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.9).
59	What method will be used to integrate and track significant issues expressed in the environmental assessment during the preliminary design phase for the project and the cost assessment assigned to the consortium led by PricewaterhouseCoopers?	Mitigation measures will be integrated into the performance quotes used in the context of calls for tenders for the contract to build the New Bridge for the St. Lawrence.
60	Will there be environmental monitoring/tracking to ensure that the contractor implements mitigation measures?	Yes, this aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 9.8).
61	Proposal to ensure monitoring of objectives by an independent authority.	An oversight committee presided over by Transport Canada (TC) will be set up. Under the Canadian Environmental Assessment Act (CEAA), TC is responsible for the mitigation measures.
62	Proposal to double or triple the monitoring system with a different process that does not use the same information sources.	An oversight committee presided over by TC will be set up. Under the CEAA, TC is responsible for the mitigation measures.
63	It is critical that the environmental assessment also considers the deconstruction of the bridge.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 7).

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
64	The study specifies that the waste from the deconstruction of the Champlain Bridge between Nuns' Island and the South Shore will be sent to the south bank for reclamation. The plant should already be selected; determine whether it can handle all of the waste material and plan for mitigation measures for traffic and pollution associated with transporting this waste material.	It is currently too soon to identify a plant. The list of recyclers is available at: http://www.recyc-quebec.gouv.qc.ca/client/fr/repertoires/rep-recuperateursDetails.asp?etat=search.
65	How are you going to take sustainable development principles into account? There is no mention of this in the report.	The first and second sections (Section 9) of the environmental assessment report have been changed, following this comment. Also, the project lifecycle will be taken into consideration during the engineering phase.
66	Proposal to display the temperature and rain data separately.	The data are provided for informational purposes.
67	Proposal to focus on light pollution emitted by the infrastructure.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.8).
68	Insufficient concern for the human environment. It would have been desirable to see the project from the perspective of the neighbouring population's health.	Noise pollution and air quality are environmental components that are directly linked to health. These issues are taken into consideration in both reports.
69	Suggestion to reduce the environmental impacts during the work and in the long term.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 7).
70	The study should anticipate the effect of future climate change, rather than being based solely on past weather data (other than for water levels).	This issue is taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 8.3 of the second part of the environmental assessment report).
71	Will the project reduce my property value if I live in the vicinity?	We do not foresee any changes in property values within the vicinity of the projects. It is possible that implementing certain mitigation measures (for example building noise barriers) will have a positive effect on the quality of life for residents in the vicinity of the project.
72	What mitigation measures will be implemented to protect property values in the vicinity of the project?	We do not foresee any changes in property values within the vicinity of the projects. It is possible that implementing certain mitigation measures (for example building noise barriers) will have a positive effect on the quality of life for residents in the vicinity of the project.
73	Wondering about the fact that there is no mention of the Mohawk community in relation to the archaeological remains found?	This issue was added to the first part of the report on the project's description and the environment (Section 4.4.10).

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
74	Is the prehistoric archaeological site an issue?	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.13).
75	Proposal that the project not compromise the city's intent to make the LeBer site into a commemorative site.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.13).
76	Concern about the fact that there is no bike path on the bridge/maintain the bike path at all times. It should be pleasant and well decorated; the path along the seaway and the ice control structure should be kept.	This issue became more apparent during the first part of the environmental assessment on the effects of the project and the proposed mitigation measures. The project plans for a safe bike path and sidewalk on the new bridge over the St. Lawrence and the Nuns' Island Bridge. Concerning keeping the current bike paths within the project's boundaries, this issue is taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures.
77	Proposal that pedestrians be separated from bicycles, as they are on the Jacques Cartier Bridge.	The active transportation lane that will be added to the New Bridge over the St. Lawrence and the Nuns' Island Bridge will be a multi-use lane. Its final design will be determined during the engineering phase.
78	Proposal that discussions be held with representatives from the City of Montreal and Brossard to agree on the most optimal manner of having cyclists get from one bank to the other.	TC will collaborate with the involved parties.
79	Proposal that, during the project, the bike paths remain connected to each other (alternate routes would be acceptable).	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.11).
80	Proposal that the report be clearer as to how the bike paths will be affected.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.11).
81	Proposal to improve the bike/walking path network on the Verdun side.	Multi-use lanes will be added on the New Bridge over the St. Lawrence and the Nuns' Island Bridge; this is a major improvement over the current situation. It must be noted that bike path infrastructures are under municipal jurisdiction.
82	Proposal to maintain recreational and tourist activities during the construction period, in order to increase social acceptability for the new bridge construction project.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.11).
83	Proposal to ensure the safety of persons engaging in swimming activities during work.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.11).
84	Proposal to ensure bicycle/pedestrian access to the future public transit station on Nuns' Island.	The bike network is under municipal jurisdiction.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
85	Proposal that the environmental deficits be monetarily accounted for in order to make them up and provide funding from the start of the project.	The environmental losses will be compensated through the implementation of compensation plans.
86	Proposal to return a site to its initial state or to better environmental conditions, which should cost approximately the same price.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measure. When feasible, this aspect will be taken into consideration (Section 7.3 of the second part of the environmental assessment report).
87	Proposal that the environmental assessment specify the environmental deficit levels for the region.	This aspect was not taken into account in the environmental assessment.
Design		
88	Proposal that the bridge has two levels or at least plan to have a considerably solid base from the start with plans to add a second level to the bridge in order to meet future traffic needs.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
89	Concerns regarding the fact that the actual bridge could be used for other purposes instead of being deconstructed.	The New Bridge for the St. Lawrence project includes the dismantling of the Champlain Bridge.
90	Will the highway exits pass near Nuns' Island Évolo buildings?	The preliminary layout for the New Bridge for the St. Lawrence project can be found on the TC website (http://www.tc.gc.ca/fra/programmes/ponts-nouveau-pont-pour-le-saint.laurent-2757.htm).
91	Proposal to enlarge the north exit for Atwater in order to allow cars to exit gradually and not abruptly like now.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
92	Proposal to eliminate the lower section between the Verdun and Atwater exits.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
93	Proposal for an underground development of the portion that opens onto Nuns' Island in the northern direction up to the point where the highway meets the aqueduct.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
94	Is the tunnel solution an option? If not, why?	The pre-feasibility assessment evaluated the possibility of building a tunnel and concluded that this solution would not be chosen. In fact, building and operating a tunnel would be much more expensive than a bridge. In addition, the tunnel would lend itself less to modifications. Construction would be complicated by major concerns pertaining to the environment and operations, specifically concerning the transportation of hazardous materials.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
95	Proposal to build a bridge between Verdun and Nuns' Island for pedestrians, cyclists and emergency vehicles.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
96	Are you going to build a bridge that will provide direct access to Verdun (and thus to the Metro)?	The project for the New Bridge for the St. Lawrence is described in the first part of the environmental assessment report.
97	Proposal to install better signage on Nuns' Island road network.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
98	Proposal to ensure that the on-ramps and exits on the corridor are adequate in order to keep traffic flow as fluid as possible. In this regard, the Société du Havre specifically mentions access beginning from the Bonaventure Expressway.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
99	Proposal to use aluminum as much as possible and have a heated deck to eliminate salt.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
100	Proposal to retain the solution presented by Thérien.	Mr. Thérien met with TC on May 1st, 2012 to present and discuss his concept. Thereafter, TC gave the documents to the team of consultants hired to carry out the preliminary engineering studies, for consideration as one of the potential options. After analysing this option, the team of consultants recommends that this concept not be used.
101	Plan a direct connection to Verdun from the Bonaventure Expressway.	The New Bridge for the St. Lawrence project is described in the first report. This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
102	Proposal that the design for the New Bridge take into account the problem of ice formation on high points.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
103	Proposal to reuse the temporary causeway on a permanent basis.	The causeway will be temporary.
104	Proposal to ensure connectivity between the northern and southern parts of Nuns' Island.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.14).
105	Proposal to open up the Verdun and Southwest districts.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.14).
106	Proposal to review the Nuns' Island exit beginning at Highway 15. It is not safe.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
107	Proposal to keep the metal structure of the Champlain Bridge.	TC considered preserving the metal structure of the bridge as proposed by Mr. Thérien, who met with TC on May 1, 2012 to present and discuss his concept. Thereafter, TC gave the documents to the team of consultants hired to carry out the preliminary engineering studies, for consideration as one of the potential options. After analysing this option, the team of consultants recommends that this concept not be used.
108	Proposal that the designer take into account the recent completion of bridge infrastructures (viaduct and lanes) in this sector. They must be preserved as much as possible.	This aspect is taken into account in the second part of the environmental assessment report concerning the effects of the project and the proposed mitigation measures (Section 7.3 of the second part of the environmental assessment report).
109	Proposal that the New Bridge include section-by-section reconstruction in its initial design.	The bridge will be designed to last for 125 years. No reconstruction is planned for the near future.
110	Proposal that no simple construction or functioning flaws lead to degradation or loss of natural habitat. In this regard, the guarantee of protection must be tripled for irreversible risks and doubled for reversible risks.	An oversight committee presided over by TC will be set up. Under the CEAA, TC is responsible for the mitigation measures. It must be noted that the notion of environmental risk is taken into consideration in the engineering mandates.
111	Proposal to take into account the aesthetic aspect of the three existing billboards under federal control, development of the natural surroundings (aestheticism, maintenance, biodiversity) and measures to prevent vandalism (graffiti) that would be worth considering in this part.	When feasible, improvement of the surroundings will be taken into consideration (Section 7.3 of the second part of the environmental assessment report).
112	Proposal to evaluate the feasibility of building a vegetation-covered bridge (complete or partial or simply to increase vegetation in the area), within the framework of the second environmental assessment phase, which would make it possible to facilitate in situ trapping of GHG.	Re-vegetation of the open spaces located within the scope of the project is taken into account in the second part of the environmental assessment report concerning the effects of the project and proposed mitigation measures.
113	Proposal to take into account the planning of other works on the road network in the sector (e.g. Bonaventure, Turcot, etc.) in order to evaluate the impact.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 8.2).
114	Proposal that the New Bridge be designed for a lifespan of more than one hundred years, thus justifying the amounts involved in its construction.	The bridge will be designed to last for 125 years.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
115	Proposal that a life cycle analysis and/or analysis of the overall cost, including maintenance and operation of the infrastructure, should support the assessment of the preferred option.	This aspect was not taken into account in this environmental assessment; however, the life cycle will be analysed in another component of the project.
116	Proposal to evaluate the feasibility of incorporating recycled materials into the infrastructure without compromising the quality of the structure.	This aspect was not taken into account in this environmental assessment; however, the life cycle will be analysed in another component of the project.
117	Proposal to encourage the use of renewable energy resources (specifically for lighting).	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
118	Proposal to ensure that falling snow is taken into account in the Highway 15 sector.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project. Discussions on this subject have begun with the City of Montreal.
Riverside/Havre/Bonaventure/Parks		
119	Proposal that work related to the New Bridge for the St. Lawrence, specifically that for the Nuns' Island Bridge, should favour development of the riverside and lengthening of the existing bike network in the Verdun district in the direction of Old Montreal.	The New Bridge for the St. Lawrence project does not interfere with any other project aimed at developing the banks of the St. Lawrence.
120	Construction of the New Bridge for the St. Lawrence must integrate into its surroundings to support the creation of an urban park on the shores between the New Bridge and Victoria Bridge by incorporating the relocation of the Bonaventure Expressway into construction work for the New Bridge.	The elements mentioned do not fall within the scope of the project of the New Bridge for the St. Lawrence. Nevertheless, the proposed project will not interfere with any plans aiming to develop the St. Lawrence riverside.
121	The linear park could be connected to a new bike and pedestrian path intended for the New Bridge. We must now plan to develop the bike path under the new Nuns' Island Bridge during the design phase.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
122	The first part of the preliminary environmental assessment report completely ignores a detailed planning of the Havre de Montreal which includes three phases of the Bonaventure project. The detailed plan should have been taken into account in the first and second EA reports.	The New Bridge for the St. Lawrence project does not interfere with any other project aimed at developing the banks of the St. Lawrence.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
123	Proposal to reshape the Nuns' Island riverside upstream of the new deck in order to create a new riverside park similar to the LaSalle Rapids Park. This park could be the site of a wave surfing stationary water park.	The current environment could be improved when the level of required effort is the same as for a site revitalization/return to initial state.
124	Proposal that, in the event that a quay will be necessary on the Montreal shore, it may be wise to consider a low development of approximately 1 to 2 meters above the water level to allow for public use.	This aspect was not taken into account in the environmental assessment. If quays are built, they will not be accessible to the public during the construction phase for safety reasons.
125	Proposal to establish infrastructures intended to improve the link between the public and the river when worksites are closed.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
126	Will the forested areas in the Parc de la Terre and Tisserands Park be affected by the project?	Currently, the forested areas will not be affected.
127	Proposal to limit the cutting down of trees as much as possible in the Pointe-Saint-Charles sector (near the shore), which will serve as a work and materials storage area, in order to protect the natural surroundings including mature trees.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.5).
128	Proposal looking at the impact of the project on the forests in the area of the river.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.5).
129	Proposal that a more detailed portrait of the industrial use areas and their economic and real estate development potential be included in the current report and in the preparation of the second report.	This aspect was not taken into account in the environmental assessment.
130	Proposal taking into account the sectors chosen for the installation of the work site, which are also natural areas that could be altered during the construction phase. Their losses, even if temporary, are major irritants to the population who lives there or passes through this sector.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.5).
131	Proposal introducing riparian strips extending a length of 15 meters in order to ensure protection for the shores of the St. Lawrence.	This aspect was added to the second report concerning the effects of the project and the proposed mitigation measures. A 20-meter riparian strip will be protected when possible (Article 9.4.2 of the current measures in the second part of the environmental assessment report).

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
132	Proposal strengthening and increasing the vegetation areas along the shores and the highway, taking into account the major objectives of the Transport Plan and Sustainable Development Plan for the Montreal collective.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.5).
133	Proposal to preserve the forested areas north of the Nuns' Island Bridge.	No forested areas will be affected by the project.
Capacity		
134	Suggestion on reducing traffic into Montreal.	This aspect was not taken into account in the environmental assessment.
135	Proposal to anticipate the impact of the project on traffic, especially considering that the population on Nuns' Island continues to increase.	As part of this environmental assessment, preliminary studies on traffic, greenhouse gas emissions and air quality were conducted. This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 7) It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. It should be noted that the New Bridge project involves replacing existing infrastructure and not adding a new infrastructure to an area that did not have one. The project's impact on traffic, for example, is much lower than in the second case. Improving public and active transportation and adding a toll booth will help decrease the project's impact on traffic.
136	The environmental assessment must address the long term impact of the project on the volume of traffic and travel modes.	As part of this environmental assessment, preliminary studies on traffic, greenhouse gas emissions and air quality were conducted. This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 8.1 and 11.4) It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. It should be noted that the New Bridge project involves replacing existing infrastructure and not adding a new infrastructure to an area that did not have one. The project's impact on traffic, for example, is much lower than in the second case. Improving public and active transportation and adding a toll booth will help decrease the project's impact on traffic.
137	The project should contribute to attaining the objectives for the 2020 horizon, including reducing the volume of automobile traffic by 20% and increasing the modal share of active and public transit.	The New Bridge for the St. Lawrence project consists of replacing the existing infrastructure with a toll bridge with a public transit lane as well as an active transport lane. The Metropolitan Transport Agency (AMT) is responsible for determining the mode of public transportation and TC. Transport Canada works very closely with AMT and will provide the agency with the necessary infrastructure, adapted to the transportation mode that it determines.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
138	Proposal to measure the impact of the increase of average annual daily traffic (AADT) of vehicles to assess how a gross increase of traffic volume could affect the air quality in urban areas linked by the bridge.	As part of this environmental assessment, preliminary studies on traffic, greenhouse gas emissions and air quality were conducted. This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 8.1 and 11.4) It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. It should be noted that the New Bridge project involves replacing existing infrastructure and not adding a new infrastructure to an area that did not have one. The project's impact on traffic, for example, is much lower than in the second case. Improving public and active transportation and adding a toll booth will help decrease the project's impact on traffic.
139	Proposal to estimate to what extent the integration of a new public transit system mitigates (or increases) the impact anticipated on all of the elements covered by the environmental assessment.	As part of this environmental assessment, preliminary studies on traffic, greenhouse gas emissions and air quality were conducted. This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Sections 8.1 and 11.4) It should be noted that various traffic volume scenarios for public transportation and toll booths are being studied in another component of the project. It should be noted that the New Bridge project involves replacing existing infrastructure and not adding a new infrastructure to an area that did not have one. The project's impact on traffic, for example, is much lower than in the second case. Improving public and active transportation and adding a toll booth will help decrease the project's impact on traffic.
140	Proposal documenting the current situation in relation to road accidents in the corridor sector and assessing the impact of the new configuration and the change in the number of cars on the bridge on the number of road accidents (increase or decrease).	Various traffic volume scenarios for public transportation and tolls are being studied in another component of the project, not related to the environmental assessment. Based on these assessments, an analysis of the impact of the project on road accidents will be made.
141	Proposal to analyze the local impact in regards to traffic.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.9).
142	Proposal to enlarge the study area because the capacity of the proposed bridge will be changed and, consequently, the equilibrium of the current regional road network.	Various traffic volume scenarios for public transportation and tolls are being studied in another component of the project, not related to the environmental assessment. Based on these assessments, an analysis of the impact of the project on the road network will be made.
143	This project should incorporate elements to encourage users to switch from the automobile to another mode of transportation.	This aspect was not taken into account in the environmental assessment. Nevertheless, it must be noted that the new bridge will be equipped with a toll system and that one lane in each direction will be reserved for public transit.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
144	Proposal that the bridge have four lanes for the general public in addition to one lane for buses.	The New Bridge for the St. Lawrence project is described in the first part of the environmental assessment report dealing the description of the project and the environment. It consists of three lanes for vehicles and one lane for public transport in each direction.
145	Proposal that the bridge have four lanes.	The New Bridge for the St. Lawrence project is described in the first part of the environmental assessment report dealing the description of the project and the environment. It consists of three lanes for vehicles and one lane for public transport in each direction.
146	Proposal that the bridge possibly have a double rail lane in the centre.	This aspect was addressed in the first EA report concerning the description of the project and environment.
147	Proposal to plan two lanes (One LRT or tramway + one bus, public transit, carpooling).	The New Bridge for the St. Lawrence project is described in the first part of the environmental assessment report dealing the description of the project and the environment.
148	Proposal of a thorough analysis of the increase in capacity because it does not correspond to the objectives set by the City of Montreal.	Ridership predictions and other technical studies are currently underway. TC intends to continue consulting with various stakeholders throughout the project.
149	Two additional noise measuring stations on each end of the Champlain Bridge will make it possible to measure the intensity of the noise caused by bridge use.	This aspect is discussed in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 11.12).
150	Proposal to complete additional ridership prediction evaluations and implement adequate measures if an increase in traffic is predicted (choice of road surface, expansion joints in the roadway, toll booth locations, type of public transit, rush hour/night restrictions on heavy trucks, etc.).	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project. Nevertheless, in parallel with the environmental assessment, ridership predictions and other technical studies are currently underway.
151	Request access to the assessments that justify the planned capacity, the choice of PPP and the route layout.	The pre-feasibility assessments completed by Consortium BCDE (www.tc.gc.ca/nppsl) are serving as a basis for the work in progress. More detailed studies and discussions with the stakeholders are planned within the framework of the planning process before identifying a final solution. These assessments include the development of a case file. It will include recommendations on the procurement method for the New Bridge, predictions regarding ridership and preliminary design studies, in order to establish cost estimates for the New Bridge. Once completed in Fall 2013, some of the information will be made public. However, information related to funding, for example, will remain confidential so as not to influence negotiations with future bidders.
Public Transit		

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
152	Ensure public transit efficiency on the new bridge (for example, one lane in each direction at all times). It will also be important to plan stops on Nuns' Island as well as a parking area.	This comment will be transferred to the AMT, responsible for the choice and implementation of the public transit system.
153	Why doesn't the report address public transport? Put more emphasis on this point.	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system.
154	Proposal to use the ice control structure for public transit and building the new bridge only for automobiles and trucks.	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system.
155	Proposal to ensure that public transit remains efficient during the construction phase.	This aspect was taken into account in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures.
156	Proposal to dedicate the Victoria Bridge to the Light Rail Transit system.	This aspect was not taken into account in the environmental assessment. Victoria Bridge belongs to Canadian National. The AMT is in charge of choosing and implementing the public transport system. This comment will be transferred to the AMT.
157	Proposal favouring a mode of public transit on rails.	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system. This comment will be transferred to the AMT.
158	Proposal to build a metro instead of having public transit on the bridge.	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system. This comment will be transferred to the AMT.
159	Are you going to make it so that the capacity for public transit increases?	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system. This comment will be transferred to the AMT. The project includes one lane reserved for public transport in each direction, which will increase its capacity.
160	Construction of the New Bridge on the St. Lawrence must be integrated into the surroundings with the objective of creating conditions that favour providing the sector with an efficient means of public transport such as a light rail system.	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system. This comment will be transferred to the AMT. The project includes one lane reserved for public transport in each direction, which will increase its capacity.
161	We suggest evaluating the advantages pertaining to the reduction of GHG emissions for the "surface metro" option and presenting the findings within the framework of this assessment.	This aspect was not taken into account in the environmental assessment. The AMT is in charge of choosing and implementing the public transport system. This comment will be transferred to the AMT.
Deadline/Planning		

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
162	Concern regarding the deadline/Importance of respecting it.	Respecting deadlines is a priority for TC. Up to now, the deadlines have been respected.
163	Proposal that a construction date be given within five years.	According to the current deadline, the start date for work is planned for 2017.
164	Proposal to prioritize reconstruction of the Nuns' Island Bridge so that it has the least amount of impact possible.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project. Construction of the Nuns' Island causeway will begin in Fall 2013 (this project is not part of this environmental assessment).
165	Proposal to evaluate the possibility of working on certain stages of construction 24/7. Costs are higher but completing construction faster also has a positive effect on costs.	Work hours are discussed in the second part of the environmental assessment report concerning the effects of the project and the proposed mitigation measures. Minimizing the impact on the tranquility of people living in the surrounding areas of the project is a priority for TC.
166	Proposal to analyze the implementation strategy relative to the progression of works starting at both shores at once (versus the idea of prioritizing one shore over another) which will certainly make a big difference to citizens and the municipal infrastructures.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
167	Proposal mentioning the construction sequence.	This information will be revealed in a subsequent phase of the project.
Open Houses/Communication		
168	Mentions that the open houses lacked information (for example, concerning the project, impact and mitigation measures).	The objective of the December 2012 open houses was to inform the public on the description of the project and the environment. The effects of the project and the proposed mitigation measures are considered in the second part of the environmental assessment report and will be the focus of a second series of open houses in April 2013.
169	Disappointed by the lack of information on the question of transportation and traffic.	More details about the project will be available at subsequent stages of the project.
170	Proposal to comment further when more details about the project are available.	TC intends to continue consulting with the various stakeholders.
171	Because the plans are at the beginning stage, proposes that further meetings be held to inform the public as the project advances.	TC intends to continue consulting with the various stakeholders.
172	Proposal that this project be carried out in conjunction with the various levels of government (set up a committee, for example).	An inclusive governance structure has been set up for the project. This structure includes several committees with participation by the Quebec government, the AMT, and the cities of Montreal and Brossard. TC intends to continue consulting with the various stakeholders on a regular basis.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
173	For which steps of the project will consultations be held? When and how?	TC intends to continue consulting with the various stakeholders. For this reason, an inclusive governance structure was set up for the project.
174	Proposal that a broader advisory committee be put in place.	An inclusive governance structure has been set up for the project. This structure includes several committees with participation by the Quebec government, the AMT, and the cities of Montreal and Brossard. TC intends to continue consulting with the various stakeholders on a regular basis.
175	Proposal to hold public meetings.	TC has opted for an open house policy because the ministry feels this approach allows for a better dialogue between the environmental experts and the public.
176	Proposal that a presentation be made (oral presentation, with a PowerPoint presentation, or an easy-to-understand document) giving an outline of the project.	Because most participants liked the open house format, it will be used once again in April 2013. A PowerPoint presentation will be played in a continuous loop during the next open houses.
177	Proposal that the presentations be made by topic, after which the experts can answer questions at their respective booths.	TC has opted for an open house policy because the ministry feels this approach allows for a better dialogue with the public.
178	Wonders about the validity of the format being used for the consultations.	TC has opted for an open house policy because the ministry feels this approach allows for a better dialogue with the public. The public seems to like this format, as their comments show.
179	Will the stakeholders who were consulted at the environmental assessment stage comment on the preliminary design project in order to ensure that the challenges, transformed into objectives, were integrated?	The mitigation measures (objectives) will be integrated into the performance specifications used for the calls for tender for the mandate to build the New Bridge for the St. Lawrence. The follow-up results will be made public throughout the construction phase. TC plans on maintaining a dialogue with the public throughout the various phases of the projects.
180	Proposal to communicate more often and on a permanent basis with local stakeholders.	TC intends to continue consulting with the various stakeholders throughout the project.
181	Mentions they are disappointed by the lack of information shared with citizens regarding the Nuns' Island causeway.	The temporary causeway for Nuns' Island is a separate project and is managed by JCCBI.
182	Would like a timetable indicating the various design steps in order to provide comments and suggestions at the appropriate moments.	TC invites anyone interested in following the project's development to visit its Web site (http://www.tc.gc.ca/eng/programs/bridges-new-bridge-for-the-st.lawrence-2757.htm).
PPP/Financing/Toll		
183	Concern over the PPP formula.	This aspect was not taken into account in this environmental assessment. TC prefers the public-private-partnership formula.

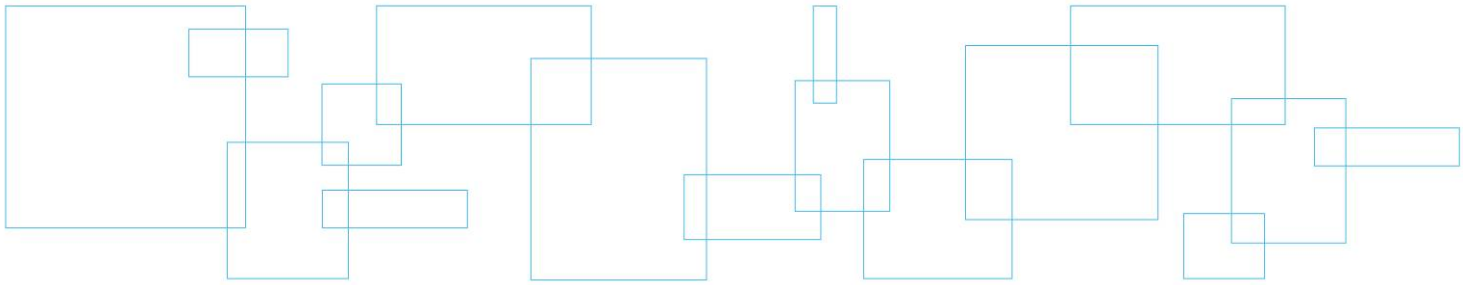
#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
184	Proposal for an international call for tenders for the construction.	This aspect was not taken into account in this environmental assessment.
185	Proposal that the ship-owners who use the seaway help finance the bridge (toll).	This aspect was not taken into account in this environmental assessment.
186	Proposal to install a truck weighing station on each side of the new bridge, if a mandatory toll is being considered.	This aspect was not taken into account in this environmental assessment.
187	The toll could cause a lot of imbalance with the other neighbourhoods in the city.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
188	Unhappy with the lack of information about the cost of the project.	Studies are currently underway to fine tune the cost estimates. More detailed costs will be provided in subsequent phases.
189	Proposal that Nuns' Island residents should not be penalized by having to use the toll system so often because of their location.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
190	Proposal that toll payments be made through a transponder system, as is used elsewhere in Quebec, supported by a flexible payment system.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project. The toll will be chosen according to current technology.
191	Proposal that the toll stations be designed in a way that does not cause traffic congestion. The study does not mention the environmental impact related to implementing a toll.	This aspect was not taken into account in this environmental assessment. It should however be noted that a modern toll system will be chosen (no toll "booths" or toll gates) and will not slow down traffic.
192	Proposal that the quality of the material be considered if the bridge is built through a PPP.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
193	Proposal that a system of sharing the fees between users and the entire metropolitan population, as a metropolitan asset, be considered.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
194	Proposal that crossing fees take into account crossing times.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
195	Proposal that care be taken regarding construction quality, collusion and "extras".	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
196	Proposal to find a hotel operator who is interested in investing in building a unique hotel with a view on the river; the flat section on the river could be used, which has aged better than the steel structure on the South Shore side.	This aspect was not taken into account in this environmental assessment.
Design/Name/Integration into the Landscape		
197	Proposal that attention be paid to the new bridge's aesthetic aspect. This could make it a tourist attraction and generate economic benefits. This aspect is also important in order to preserve the quality of the residents' landscapes and not lower their property value.	This aspect is discussed in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures. The question of the New Bridge's aesthetic aspect will continue to evolve following the environmental assessment.
198	Unhappy with the small amount of information on the bridge's design during the open houses.	The question of the new bridge's aesthetic aspect will continue to evolve following the environmental assessment.
199	Proposal to consult the public on the name of the new bridge.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
200	Proposal that a short summary of the 2006 study "*Landscape Framing of Montreal Entrance Roads*" be included in an appendix or even added to this report to add material to the landscape presentation.	This document was consulted when the first report on the description of the project and the environment was written. It will be added to the reference materials.
201	Proposal that a study on the view from the highway's outer lane would be an essential component in the landscape section.	This aspect is discussed in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures.
202	Proposal that additional support is required for the section of the report on the bridge's aesthetic aspect and positive integration into the landscape.	This aspect is discussed in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures. The question of the New Bridge's aesthetic aspect will continue to evolve following the environmental assessment.
203	Proposal that the quality objectives of the design for the New Bridge for the St. Lawrence, as well as the design process that will be chosen to ensure the exceptional quality of this design be put into context.	This aspect will be considered at a future stage of the project.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
204	Proposal that the objective of having the landscape visible be for at least 90% of the crossing time, with particular emphasis on the seaway crossing.	This aspect will be considered at a future stage of the project.
205	Proposal that the most obvious aesthetic criterion be the finishing of each element and the attention paid to the connection between its various parts.	This aspect will be considered at a future stage of the project.
206	Proposal that special efforts be made concerning future values. The bridge must reflect past and present values, and easily accommodate values to come.	This aspect will be considered at a future stage of the project.
Expropriation		
207	The path of the corridor could require the purchase of some privately-owned land in Brossard. The EA report should present this information.	At this time, no plans have been made to acquire privately owned land in Brossard.
208	Will you expropriate property?	At this time, no plans have been made to acquire privately owned land in Brossard.
Other		
209	Proposal to make a plan worksheet and map of the New Bridge (bridge entrance and exit).	The proposed route of the New Bridge for the St. Lawrence is available on TC's web site (http://www.tc.gc.ca/nppsl).
210	Proposal to be able to follow the project on the Internet.	TC invites anyone interested in following the project's progress to visit its web site (http://www.tc.gc.ca/nppsl).
211	Keep some remains of the old bridge as a tourist attraction.	This aspect was not taken into account in this environmental assessment, but will be considered at a future stage of the project.
212	Can additional information be provided on the relocation of Hydro-Québec's 735 kV towers in the area where Highway 15 will be widened?	Discussions between TC and Hydro-Québec on this subject are presently underway.
213	Why was ...for the St. Lawrence chosen as the name of the project? It seems to be a literal translation from English because of the word "pour" (for).	New Bridge for the St. Lawrence is a temporary name.
214	Would like more detailed information on the impact that traffic generated by the detours will have on the neighbourhoods during the work period.	This information will be available in subsequent stages of the project.

#	COMMENTS	TAKEN INTO CONSIDERATION: IF YES, HOW? IF NOT, WHY NOT?
215	Proposes that the various stages of the environmental assessment and their connection to the other steps of the project design be explained in greater detail.	This aspect was taken into consideration in the second part of the environmental assessment report on the effects of the project and the proposed mitigation measures (Section 7.2.1).
216	The City of Longueuil is mentioned several times between page 40 and 50 (approximately), but the bridge is in Brossard. The necessary corrections should be made.	This has been changed.
217	Proposes adding the traffic flow of people and goods to the valued components of the human environment.	The valued components of the environment were determined as part of the environmental assessment's guidelines. Following the issue of a press release, this document was the subject of a period of questions and comments and is now final.
218	Proposes identifying the limits of the Greater La Prairie Basin and the Lesser La Prairie Basin since these two bodies are often mentioned in the report.	See Figures 65 and 66 in the first report on the description of the project and the environment.
219	Proposes inserting Table 27 from the long version into the summary report rather than Table 5 from the short version.	The change has been made.
220	Proposes ensuring that the work reflects the City of Montreal's concerns contained in the 2010-2015 Montreal Community Strategic Plan for Sustainable Development.	This document was consulted as part of the environmental assessment; the document is referred to in Section 7.3 of the second part of the environmental assessment.

Appendix 2 Components of the New Bridge for the St. Lawrence Project



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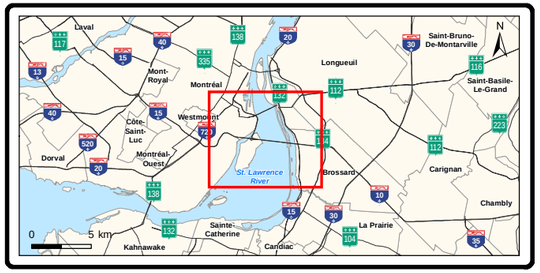
- Project Components
- Municipal limit
- Borough limit

SOURCES :
-Components : Un nouveau pont pour le Saint-Laurent, Lignes directrices finales pour l'évaluation environnementale (incluant la portée de l'évaluation environnementale) page 11, Transport Canada, 2012
- Orthophotographs : © Montreal Metropolitan Community, 2005-2011
- Satellite images : (c) 2010 Microsoft Corporation and its data suppliers



Client
Transport Canada / Transports Canada

Project
New Bridge for the St. Lawrence
Environmental Assessment

Title
Figure 3
Project Components for the New Bridge for the St. Lawrence

DESSAU | CIMA+
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Prepared	Ghyslain Pothier	Discipline	Geomatic
Drawn	Gabriel Corbin	Scale	1:30 000
Checked	Ghyslain Pothier	Date	2013-03-19
Project manager	Sylvie Côté	Sequence No.	01 of 01

Serv. char.	Project	Wbs	Disc.	Type	Drawing No.	Rev.
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SIZE 11x17

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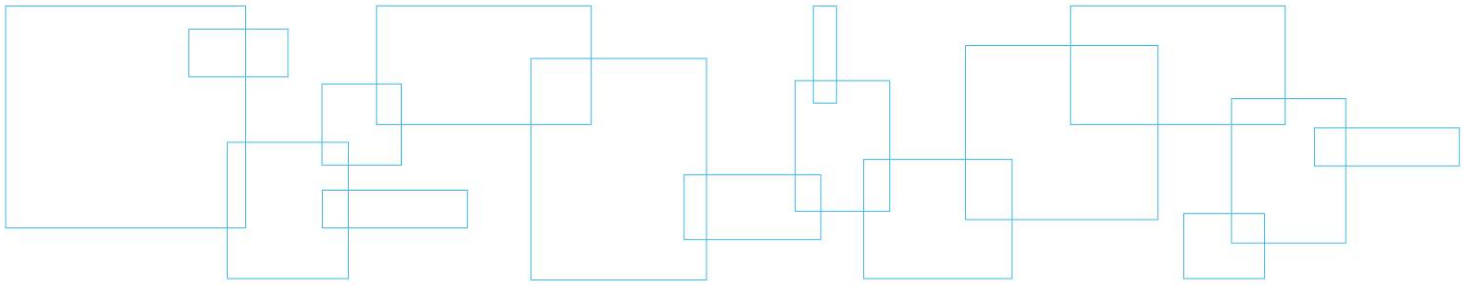
Appendix 3 Excerpt from Archeological Report



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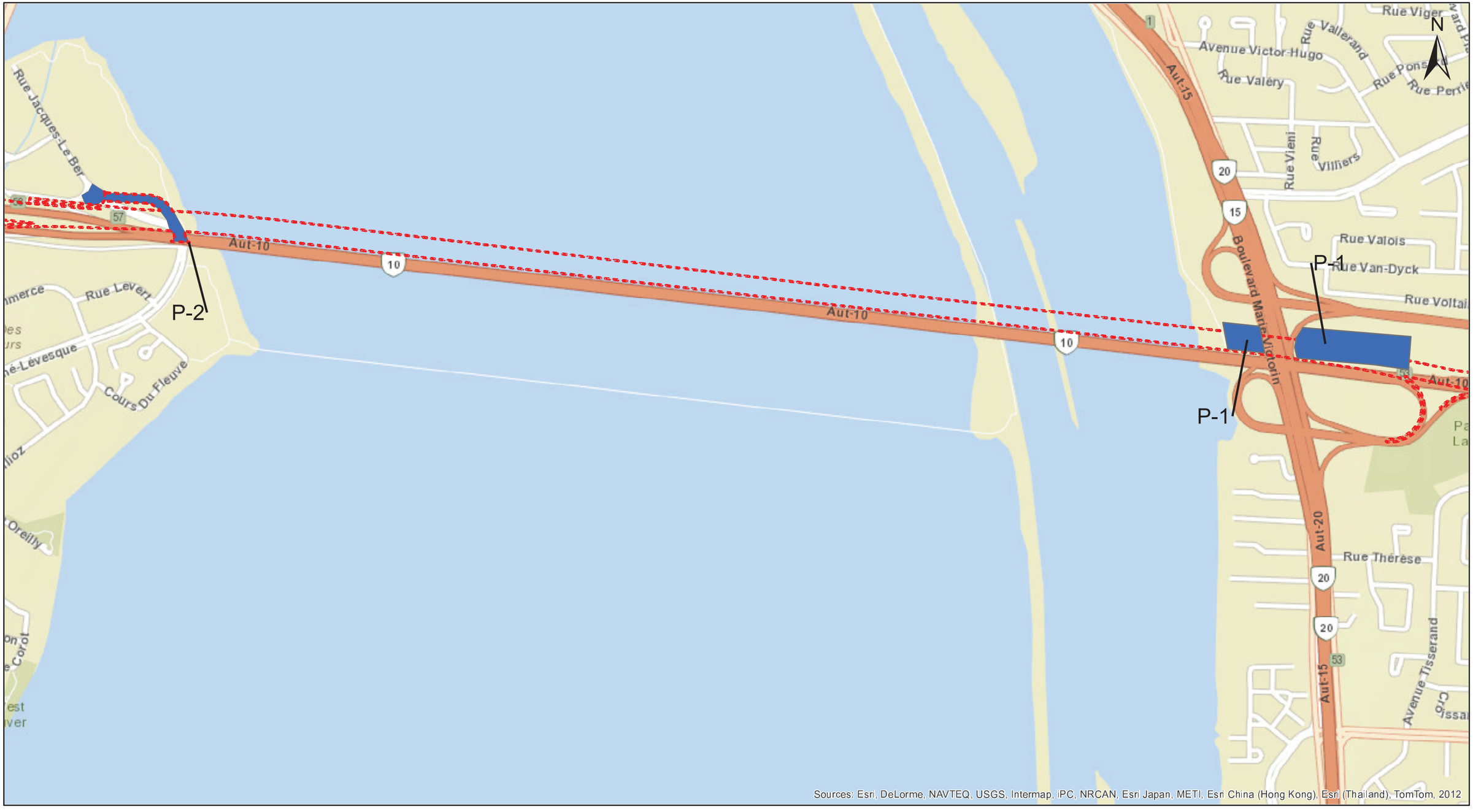


Figure 16 - Localisation des zones de potentiel préhistorique

Zone de potentiel préhistorique

Empreinte du nouveau Pont

ÉCHELLE : 1:15 000

0 137.5 275 550 m

Date
Janvier 2013

Numéro
de projet
850-704

Arkéos inc.
Société d'expertise en recherches anthropologiques

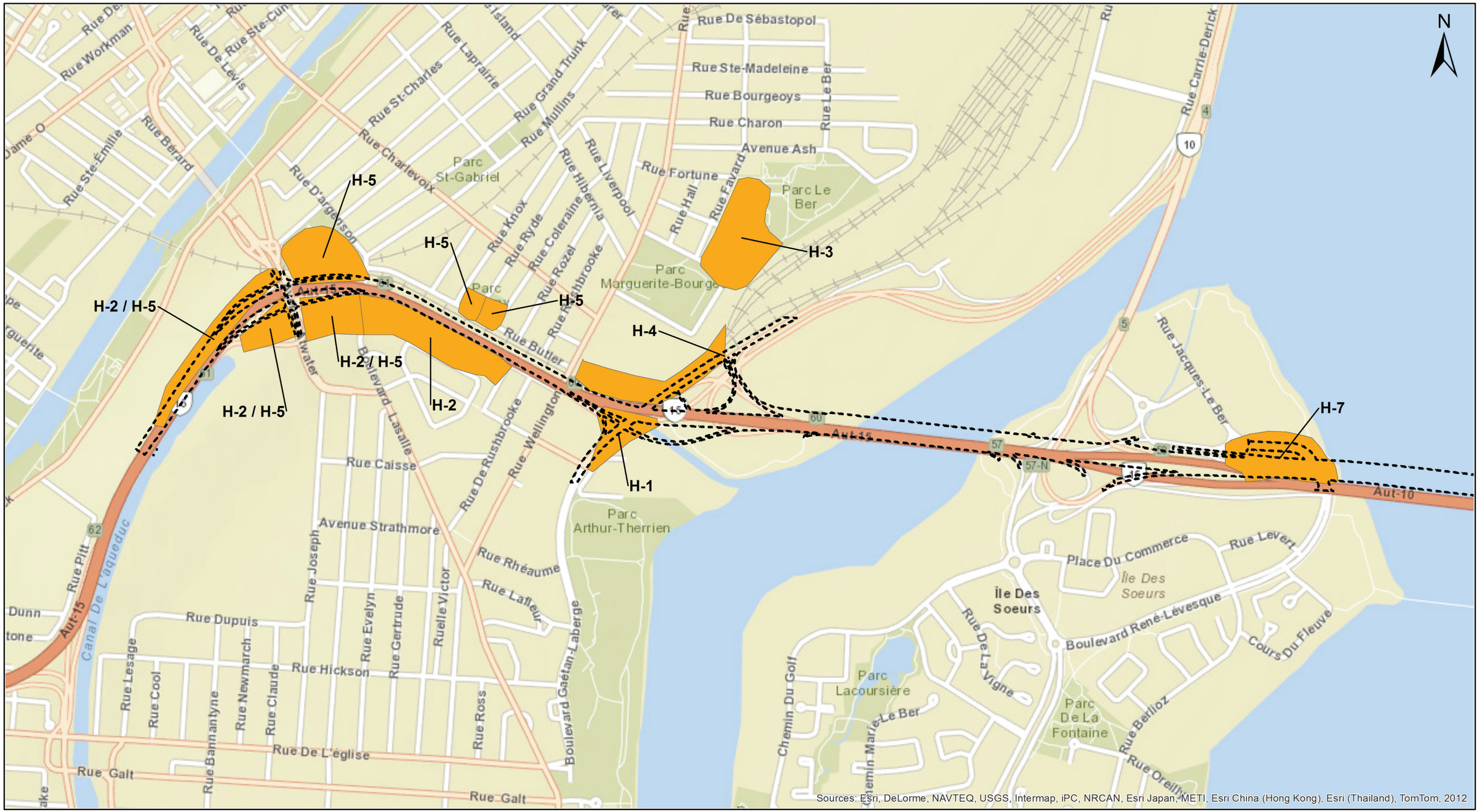


Figure 36 - Localisation des zones de potentiel historique (Île de Montréal et Île des soeurs)

Zone de potentiel historique

Empreinte du nouveau Pont

ÉCHELLE : 1:15 000

0 130 260 520 m

Date
Janvier 2013

Numéro de projet
850-704

Arkéos inc.
Société d'expertise en recherches anthropologiques

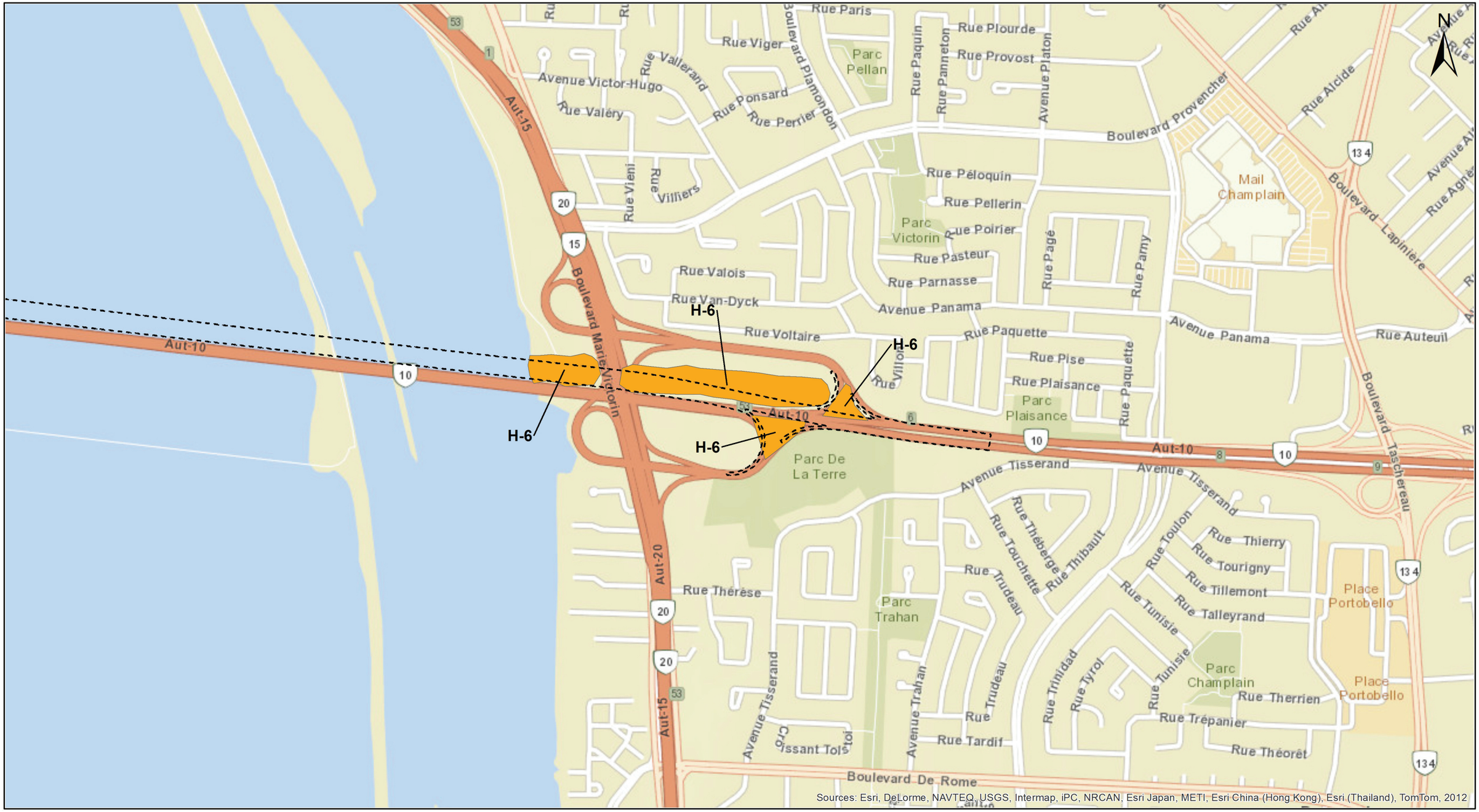


Figure 37 - Localisation des zones de potentiel historique (Rive sud)

Zone de potentiel historique

Empreinte du nouveau Pont

ÉCHELLE : 1:15 000

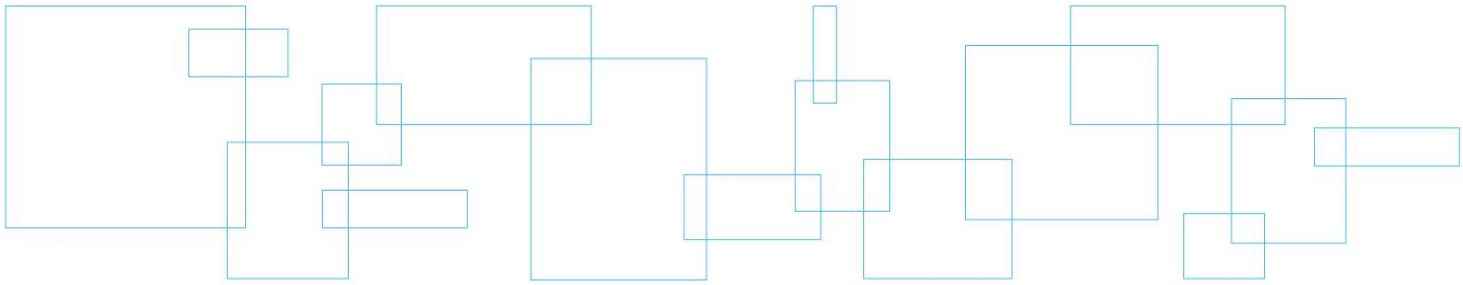
0 130 260 520 m

Date
Janvier 2013

Numéro de projet
850-704

Arkéos inc.
Société d'expertise en recherches anthropologiques

Appendix 4 Noise-Sensitive Areas



DESSAU | CIMA+

B-C2 — Proposed noise measurement point with duration

B1 — Location of noise surveys

1 — Noise-sensitive area - Preliminary

Noise sensitive area not retained (bike path)

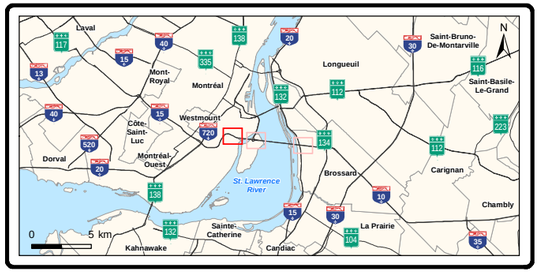
Potentially negative sound impact area

CN railway track

Municipal limit

Borough limit

SOURCE :
- Orthophotographs: © Montreal Metropolitan Community, 2005-2011



Client: Transport Canada / Transports Canada

Project: New Bridge for the St. Lawrence Environmental Assessment

Title: Figure 80 Location of Noise-Sensitive Areas in the City of Montreal Sector

DESSAU | CIMA+
1060, rue University, suite 600
Montréal (Québec) H3B 4V3
Phone: 514.281.1010
Fax: 514.281.1060

Prepared	Yannick Cordon	Discipline	Geomatic
Drawn	Geneviève Lemay	Scale	1:5 000
Checked	Ghyslain Pothier	Date	2013-03-19
Project manager	Sylvie Côté	Sequence No.	01 of 01

Serv. char.	Project	Wbs	Disc.	Type	Drawing No.	Rev.
068	P-0000810	110	GO	D	0071	00

SIZE 11x17

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B-C2 Proposed noise measurement point with duration

B1 Location of noise surveys

1 Noise-sensitive area - Preliminary

Noise sensitive area not retained (bike path)

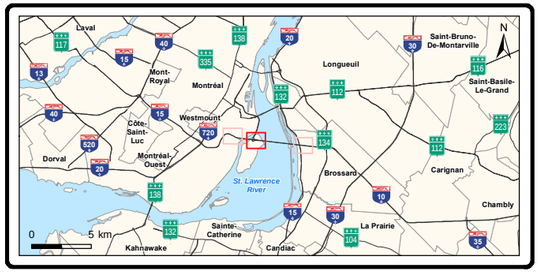
Potentially negative sound impact area

CN railway track

Municipal limit

Borough limit

SOURCE :
- Orthophotographs: © Montreal Metropolitan Community, 2005-2011



Client: Transport Canada / Transports Canada

Project: New Bridge for the St. Lawrence Environmental Assessment

Title: Figure 81 Location of Noise-Sensitive Areas in the Nuns' Island Sector

DESSAU | CIMA+
1060, rue University, suite 600
Montréal (Québec) H3B 4V3
Phone: 514.281.1010
Fax: 514.281.1060

Prepared	Yannick Cordon	Discipline	Geomatic
Drawn	Geneviève Lemay	Scale	1:5 000
Checked	Ghyslain Pothier	Date	2013-03-19
Project manager	Sylvie Côté	Sequence No.	01 of 01

Serv. char.	Project	Wbs	Disc.	Type	Drawing No.	Rev.
068	P-0000810	110	GO	D	0072	00

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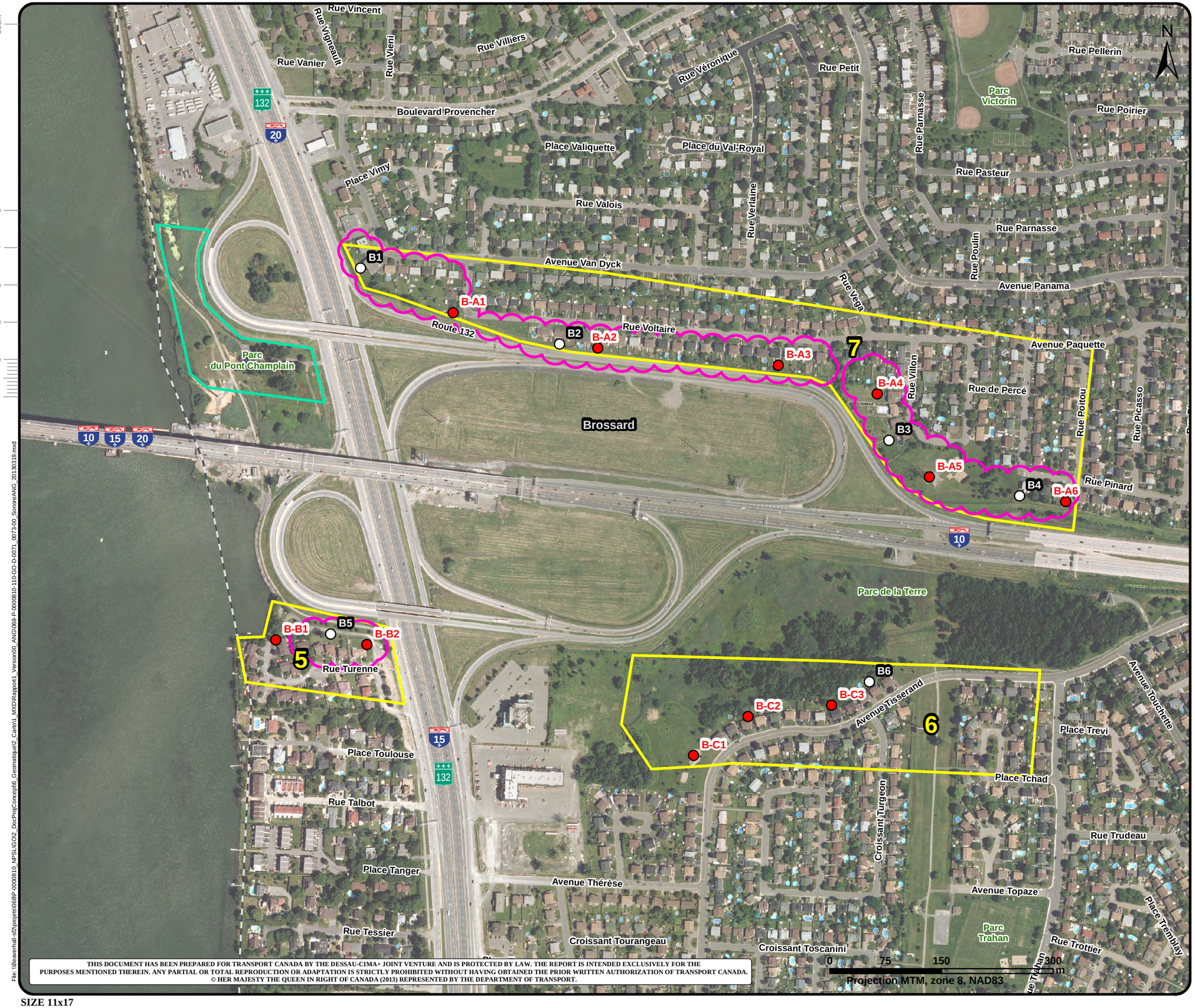


B-C2 Proposed noise measurement point with duration

B1 Location of noise surveys

1 Noise-sensitive area - Preliminary

Noise sensitive area not retained (bike path)

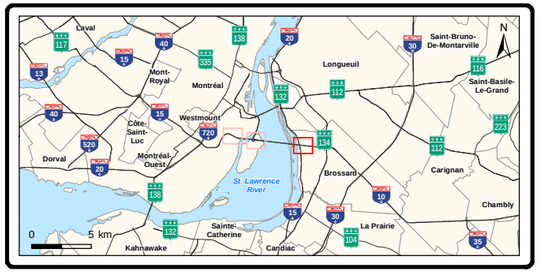
Potentially negative sound impact area

CN railway track

Municipal limit

Borough limit

SOURCE :
- Orthophotographs: © Montreal Metropolitan Community, 2005-2011



Client: Transport Canada / Transports Canada

Project: New Bridge for the St. Lawrence Environmental Assessment

Title: Figure 82 Location of Noise-Sensitive Areas in the City of Brossard Sector

DESSAU | CIMA+
1060, rue University, suite 600
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Phone: 514.281.1010
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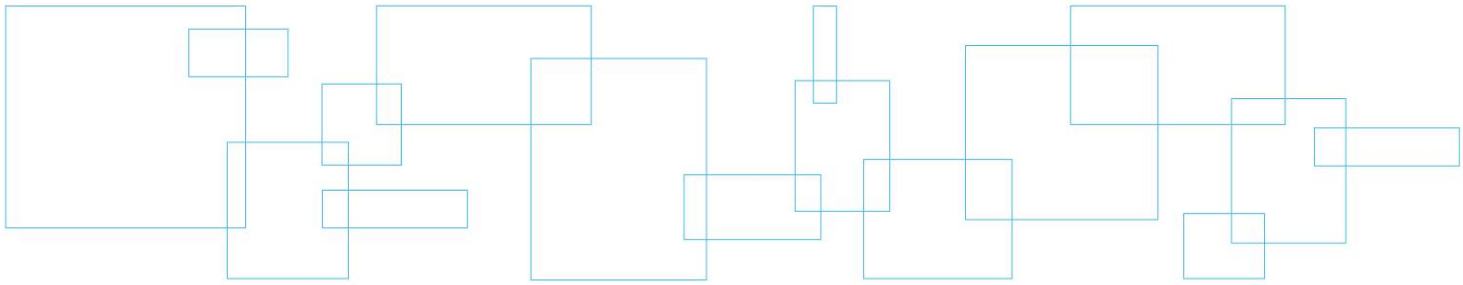
Prepared	Yannick Cordon	Discipline	Geomatic
Drawn	Geneviève Lemay	Scale	1:5 000
Checked	Ghyslain Pothier	Date	2013-03-19
Project manager	Sylvie Côté	Sequence No.	01 of 01

Serv. char.	Project	Wbs	Disc.	Type	Drawing No.	Rev.
068	P-0000810	110	GO	D	0073	00

SIZE 11x17

File: \\Beaverhall-sf2\projets\068P-0000810_NPSL\GO\2_DocProj\Concept\6_Geomatique\2_Carto\1_MXD\Rapport1_Version\00_ANG\068-P-0000810-110-GO-D-0071_0073-00_SonoreANG_20130319.mxd

Appendix 5 Recommended Approach for Noise Mitigation Measures



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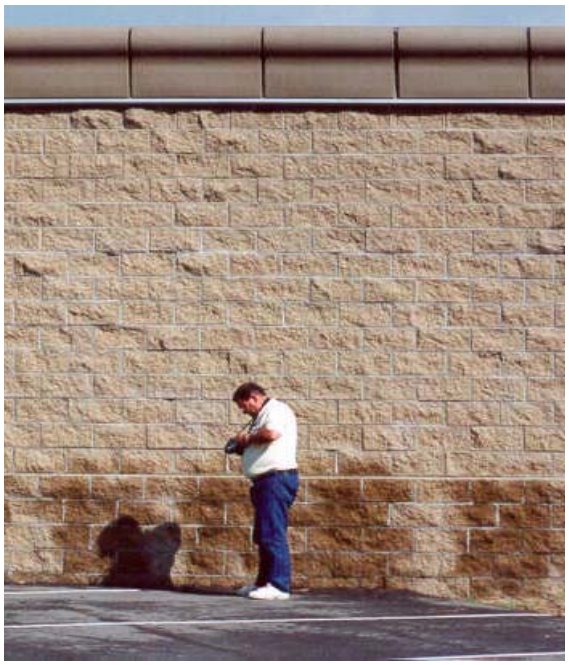
EXAMPLES OF NOISE BARRIERS

Concrete wall



Gabion wall

Earth berms

Vegetation barriers

Combinations

Transparent wall